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Contents

Volume 105—No. 3 **July 17, 1939**

READER COMMENTS 17
AS THE EDITOR VIEWS THE NEWS 21
NEWS
"All for Defense" Revives Europe's Heavy Industries 23
Steelworks Operations for Week 25
Air-Conditioned Blast Furnace Now in Operation in Alabama 26
5233 Foundries in U. S., Canada 26
Offset Power Plant in Harvester Tractor Gives Wide Vision 27
Sees Improvement in Tin Plate as Increasing Its Use 28
1938 Taxes More Than Double Dividends 28
What's New at Pittsburgh 29
Men of Industry 30
Obituaries 31
Aviation 35
Meetings 38
"Prejudice Retards Welding Progress, Prevents Economies" 40
Portrays Locks' 4000-Year Span 41
WINDOWS OF WASHINGTON 32
MIRRORS OF MOTORDOM 37
EDITORIAL—Our Tax System Needs Revamping 42
THE BUSINESS TREND
Activity Index Reflects Holiday Interruption 43
Charts and Statistics 44-45
TECHNICAL
Improved Tooling Boosts Machine Tool Efficiency 46
Check and Double-Check for Quality Control 48
Thread System Permits Use of Cap Screws in Light Alloys 74
Hoist Speed Range 35:1 81
MATERIALS HANDLING
Conveyorized 50
POWER DRIVES
Graphic Instruments 58
PROGRESS IN STEELMAKING
Tension Control 63
JOINING AND WELDING
Tablet-Arm Chairs 68
METAL FINISHING
Finishing Die Castings 72
INDUSTRIAL EQUIPMENT 76
NEW METAL PRODUCTS 82
MARKET REPORTS AND PRICES 85
The Market Week 86
BEHIND THE SCENES 104
CONSTRUCTION AND ENTERPRISE 107
INDEX TO ADVERTISERS 114

PRODUCTION • PROCESSING • DISTRIBUTION • USE

How Medium-Carbon Ferromanganese simplifies production of Low-Carbon Steel

IN the production of low-carbon steel, medium-carbon ferromanganese introduces less carbon to the bath than standard ferromanganese. Consequently, oxidation of the bath need not be so severe; the heat can be tapped from 15 to 30 minutes sooner; and furnace output is increased. Refractory costs and total conversion costs are lowered. In addition, medium-carbon ferromanganese inhibits the formation and segregation of hard manganese carbide areas in the finished steel.

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STEEL
PRODUCTION • PROCESSING • DISTRIBUTION • USE

As the Editor Views the News

■ STEEL production last week recovered most of the holiday loss, (p. 25) rebounding 8½ points to 50½ per cent of ingot capacity. The remainder of the loss (p. 85) is expected to be regained before the end of July. The trend in consumption in the main is slightly upward, with the labor situation in the automobile industry a chief cause of concern inasmuch as it already has resulted in some requests to hold up steel shipments. The price of scrap, to some extent a barometer, is tending upward. Leading aircraft builders expect (p. 35) to step up their production by an average of 30 per cent during the second half. Domestic sales of household refrigerators by leading producers in May amounted (p. 41) to 254,805 units. Domestic orders for machine tools (p. 25) improved further in June.

• • •

Five new patent bills, aimed at speeding the patent process, were passed last week (p. 34) by the house. Two pending senate bills provide for a new circuit court of patent appeals and for limiting the life of a patent to 20 years from application date. Senate foreign relations committee is considering the Pittman resolution which would embargo exports of arms, ammunition, implements of war, iron, steel and scrap metals to Japan. Effective immediately, government supplies, except in a few instances, are to be purchased by the procurement division of the treasury department. If the President's lend-spend program is ratified by congress, it will result in the expenditure of $770,000,000 on so-called self-liquidating projects during the current fiscal year.

New Patent Legislation

• • •

Tin plate is not likely to be displaced by any other material in the food container field, according (p. 28) to Dr. H. A. Baker, president, American Can Co. . . . Taxes on industry last year (p. 28) amounted to almost two-thirds of net earnings before taxes and dividends and were more than twice the amount paid in common dividends. . . . Most SWOC members, according to R. L. Hartford, STEEL's Pittsburgh editor, have been drilled that the sales people are not holding up their end in the steel business; there is talk (p. 29) of another fight against "little steel". . . . If the air conditioned blast furnace of Woodward Iron Co. performs as expected, blast furnace practice in the South (p. 26) may be revolutionized. . . . International Harvester Co. (p. 27) unveils its new small farm tractor.

Taxes Twice Dividends

• • •

Great progress has been made in tooling machine tools so as to obtain maximum production at least cost; latest methods (p. 46) will be featured at the coming machine tool exposition; the dollars-and-cents information to be gained along this line, says Guy Hubbard, STEEL's machine tool editor, alone will justify large attendance at the show. . . . Quality control of rolled product is maintained at the Irvin works (p. 48) with the aid of instruments and special facilities. . . . Complete mechanization of handling operations (p. 50) continues to be applied in high production porcelain enameling. . . . Two new types of Meehanite metal now are available for applications in which wear resistance must be combined with easy machinability. . . . Iron perchloride solution (p. 62) is most satisfactory for etching monel metal.

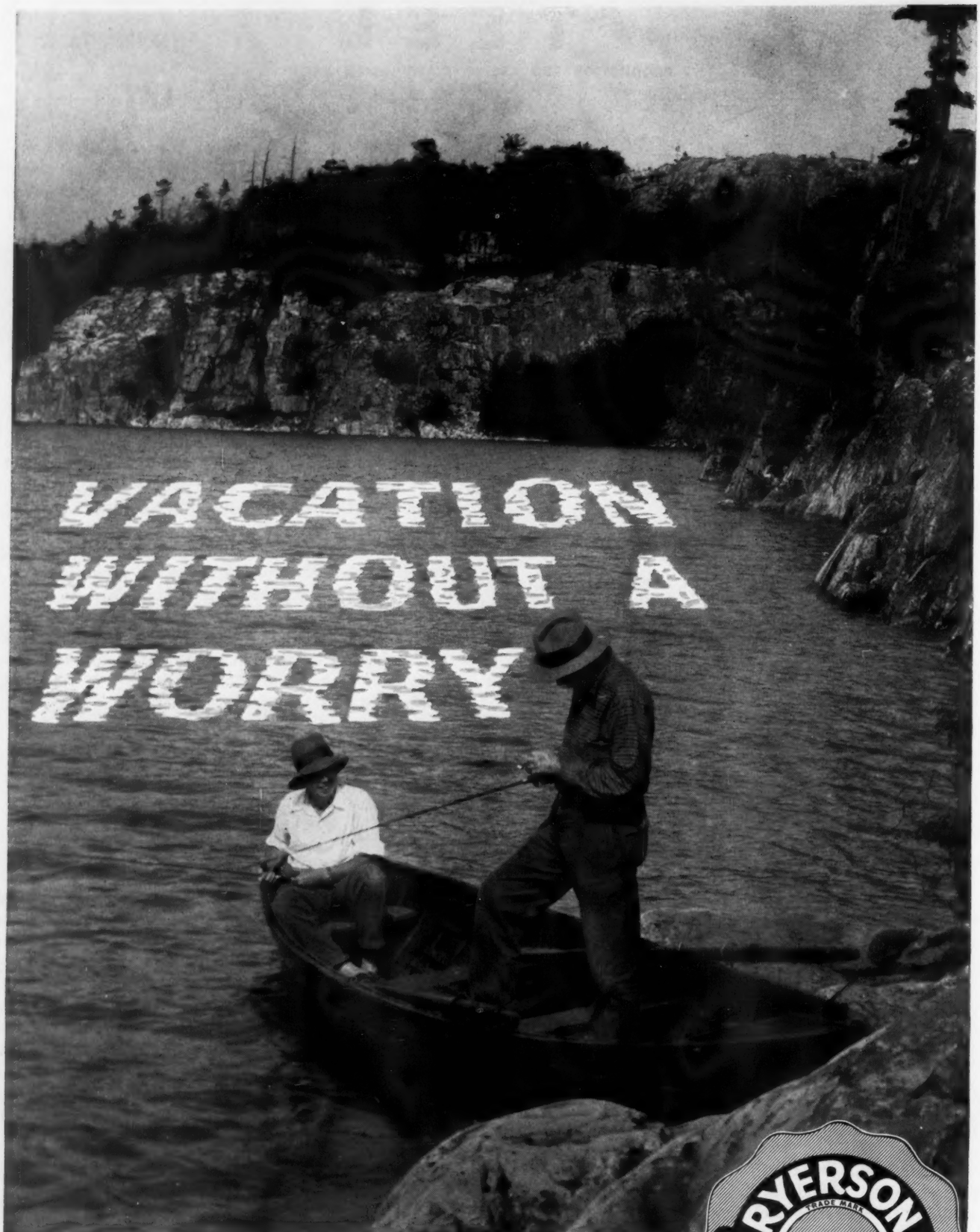
Profit At Show

• • •

Two authorities discuss (p. 63) the factors involved in control of tension in cold rolling of strip steel to increase rolling speeds, reduce maintenance, improve accuracy of gage and move up production. . . . Metal shot (p. 62) plays an important part in making sharply defined X-ray photographs of irregular metal objects. . . . Revised volume covering sampling and analysis of carbon and alloy steels as practiced by subsidiaries of United States Steel Corp. now (p. 67) is available. . . . Unusual automatic polishing and buffing machines feature the die casting finishing division (p. 72) at the Ternstedt plant of General Motors Corp., Trenton, N. J. . . . New system of fastenings is available for screws to be inserted in tapped holes (p. 74) in light alloys such as aluminum and magnesium.

Automatic Polishing

E C Kreutzberg



The Ryerson "Vacation Without a Worry" plan eliminates all thought of delayed, slow or uncertain steel deliveries. It also gives you assurance against interrupted shop schedules, fabricating delays and increased production costs. All you need do is leave the vacation order, "Call Ryerson when steel is needed." Emergency as well as regular requirements will be shipped promptly from Ryerson stocks of Certified Quality Steels—steels selected for uniformity and desirable working qualities—in short, steels that save shop time, reduce spoilage and lower labor costs.

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STEELS

"All for Defense" Revives Europe's Heavy Industries; Steel Near Capacity

By VINCENT DELPORT
European Manager, STEEL

LONDON

■ INDUSTRIAL Europe is as busy as a beehive, but the products manufactured as a result of its activity have not the sweetness of honey. Practically every country in Europe is feverishly making armament "for defense"—for if one takes at their face value the spoken words of government leaders and the written word of the press, each nation has to defend itself, but none intends to attack.

While this conundrum is waiting to be solved, furnaces are pouring steel, and rolling mills, forges and foundries are turning out a variety of material which in the shape of shells, guns, warships or shelters will either be given to destruction or, if and when mankind recovers its sanity, will be a boon to scrapmen.

With every nation straining its financial resources as well as taxing the energies of its people, the old saying "It's an ill wind that blows no good" can be applied in this sense—that the general feeling of impending danger has brought about in certain countries a new unity between parties and social strata, which had been sadly lacking in recent years. It also has caused a revival in many industries that had been unable to operate economically owing to restricted output.

Thus the production of steel across Europe from Great Britain to Rumania has surged upward, and according to present indications 1939 may be a year of record production in many countries. Russia is the only major European power whose output seems to be lagging behind 1938.

The following table giving the output of steel during the first five months of this year in the principal producing countries, Russia excluded, shows the trend compared with the corresponding period in 1938. The countries selected produce about 70 per cent of all European output. Russian returns so far as reported are given separately.

(Gross tons, January-May)

	1939	1938
Great Britain	5,230,000	5,150,400
France	3,145,000	2,704,000
Belgium	1,115,000	892,000
Luxemburg	740,000	564,000
Italy	*925,000	907,000
Germany	10,072,000	9,186,000
Czechia	*667,000	809,000
Poland	814,000	590,000
TOTAL	22,708,000	20,802,000
Russia, Jan.-March	4,232,000	4,417,000

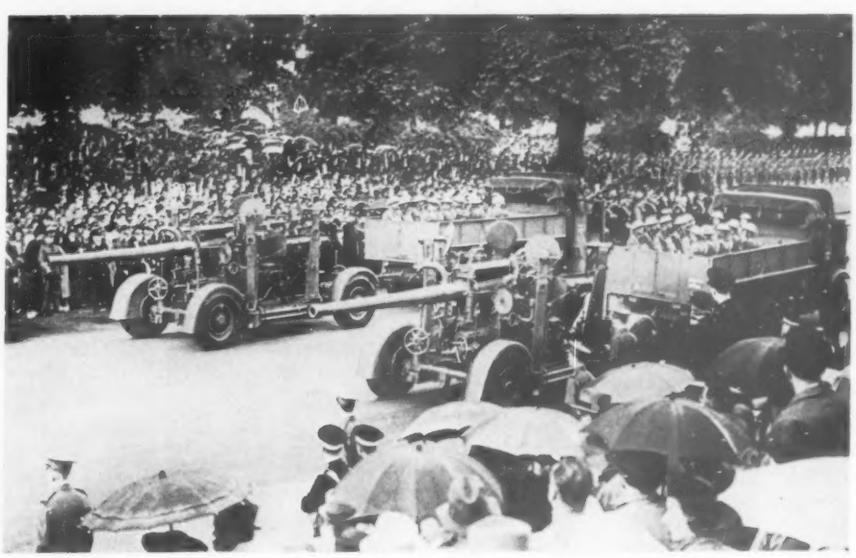
*May estimated.

In regard to Great Britain the increase is slight, but in the first three months of 1938 steel output was high, and from March it decreased rapidly, whereas the present tendency is definitely upward. Output in May this year—1,218,100 tons—was an all-time record.

German figures include Austria from March, 1938. Czech figures show a material decrease, owing to the transfer of some Czech works to Poland, and the Polish report reflects a corresponding increase. For the eight countries, Russia excluded, the gain to the end of May is about 9 per cent.

In France recent recovery has been most spectacular and effective. Six months ago we were writing that conditions in that country showed little or no improvement due to the effects of political confusion and antagonism between labor and employers. In our review of European conditions in the first quarter

Britain Parades Air Raid Forces



■ Mechanized evidence of Great Britain's progress in air raid defense paraded recently before King George VI, Queen Elizabeth, Queen Mother Mary and crowds in Hyde Park, London. Manning the antiaircraft guns on review were 20,000 National Service volunteers. NEA photo

this year (STEEL, April 24, p. 15) we were able to report progress. Since then two visits to France at one month's interval have brought convincing proof of a complete change of temper in the French people, accompanied by a greatly improved economic situation.

The French people are fully aware of dangers in present international affairs; their mind is made up, and the majority are calm and confident. Production has risen, the financial position has strengthened, relations between employers and workers are more satisfactory. There have been no large strikes for some time. Provisions of the 40-hour-week law, although still on the statute-book, are provisionally modified by mutual consent so that urgent work is unimpeded by restrictions on hours and output, suitable compensation being paid for extra hours.

Many difficulties are still to be overcome by industrial leaders. As regards the steel industry, some relief has been accorded to manufacturers by the increase in the price of iron and steel products allowed by the government price commission. The increase which applied to pig iron from June 16, and which applies to steel products as from July 1, ranges from 7 to 10 per cent.

It would seem the authorities were loath to grant the increase to steelmakers, as efforts are being made to prevent the general price index from rising. According to certain reports, when the minister for public works went to Poland earlier in the year he agreed that Poland would deliver 400,000 tons of coking coal to the French steel industry, but the steelmakers claimed the quality of this material was unsuitable. They accepted the contract, however, with the understanding they would be permitted to raise the price of steel products as a compensation.

French Steelworks Busy

The increase is calculated partly to cover advances in production costs and partly to enable companies to develop and modernize their plants and equipment. Unfortunately the price of imported coking coal went up almost immediately after settlement of the steel price question and this will neutralize advantages gained by works that depend mainly on imported coking coal.

The French steel industry is very active. During the past month the semifinished-steel syndicate has booked 125,000 tons, against 45,000 tons at this time last year. In the same period rolled steel contracts amounted to 130,000 tons, compared with 60,000 tons. This activity is due largely to work associated with armament and defense. Certain private industries, particularly building, are suffering from the effects of the war scare. However, heavy industries are well occupied, unemployment is rapidly decreasing, and consumption of electric current is advancing. In general the economic situation of France is more satisfactory than it has been for years.

In Belgium and Luxemburg steel is active, Ougree-Marihaye in Belgium operating at about 80 per cent of capacity. Part of the Belgian output is used for defense purposes, but the larger proportion goes to South American countries and to those markets that prefer not to buy from totalitarian countries. Open to French, Belgian and Luxemburg products are other export markets which normally purchase their requirements from Great Britain, but are unable to place all their orders there owing to Britain's own needs.

Must Import Scrap

In Great Britain many of the heavy industries are working at capacity. Steelworks are calling on pig iron producers to supply more basic iron, and about a dozen blast furnaces have been put in operation since the beginning of the year. Scrap and semifinished steel have to be imported from the continent of Europe and Australia, and large tonnages of scrap have been purchased in the United States. As previously stated, steel output in May was an all-time record.

Considerable incentive has been given to the shipbuilding industry through the government assistance scheme in the form of a subsidy of £2,750,000 over a period of five years for tramp shipping, and the provision of a capital fund of £10,000,000 in the form of loans to shipowners, to be extended within two years at low rates of interest for building tramp and cargo liners in British yards. As a result, ships totaling about 700,000 gross tons were ordered in British shipyards in April and May.

A substantial proportion of industrial activity is due to defense work. According to certain reports this proportion at present is about 30 per cent, but it is difficult in some instances to draw a dividing line between "defense" and ordinary requirements.

An idea of British activities is best given by a statement in parliament by Oliver Stanley, president of the Board of Trade, in which he said inland consumption of coal was substantially greater than a year ago, although exports, particularly to Spain and France, had suffered a heavy decline. He drew attention to expansion in the iron, steel and shipbuilding industries, and also referred to the amount of business due to rearmament work.

He pointed out, however, that there are a great many signs indicating recovery of British industry is not due so much to rearmament as some believe; this is indicated by the fact there is no apparent tendency toward a large increase of imports of raw materials coupled with a falling off of exports. In the first three months this year the volume of exports increased 3 per cent over last year, and imports fell by 3 per cent in volume and 11 per cent in value. Thus it may be seen the economic situation of Great Britain, particularly as regards heavy and basic industries, has improved materially.

Heavy industries in Germany are working at fever heat. Certain consumers are forced to substitute wood, cement or other materials for steel. Germany is using its low-grade iron ore, with accompanying shortcomings.

There is no unemployment, but the country is severely handicapped by a shortage of skilled labor. Labor contracts are directly controlled by state officials, and private undertakings have little initiative when wishing to hire or dismiss labor, or in regard to wages or hours. Private firms have to face the competition of state-controlled firms, such as the Hermann Goering steelworks, and also the state requirements of compulsory labor on fortification, armament or land work. There are considerable delays in delivery, especially manufactured goods, and orders for new automobiles, for instance, can be fulfilled only in nine and sometimes 12 months.

Czech Plants Aid Reich

Germany now has a hold on the iron and steel industry of Bohemia and Moravia, formerly constituent parts of the republic of Czecho-Slovakia. The German steel cartel can avail itself of deliveries of 42,000 tons per month from Czech works. The new board of directors of the Skoda works at Plzen includes 12 Germans and nine Czechs; control of firms with non-Aryan capital is gradually being taken over by German or pro-German interests.

It is apparent that steel output in Germany is not rising at the rate the country requires. This is due partly to a deficiency of high-grade ores, and partly to the fact that plants are constantly pushed to capacity. As the program of development nears completion, the capacity of steel production for greater Germany should eventually exceed 30,000,000 tons. The question remains, how will that capacity be used if and when armaments are no longer required?

Most other industrial countries

in Europe show signs of considerable activity. The Italian heavy industries are busily engaged and, here again, certain restrictions are imposed on use of steel products by private concerns. A new steelworks has been opened in Rumania with capacity for producing 100,000 tons annually.

Spain has a considerable amount of potential activity for rebuilding its industries. Some foreign help, particularly in the form of capital, and raw materials, is required. An interesting sidelight given by an eyewitness just returned from Spain indicates that Italian and German assistance is accepted more or less unwillingly, but French influence is definitely resented, owing to the part official France played during the civil war.

June Machine Tool Orders Slightly Lower

■ Domestic machine tool orders in June were slightly higher than those for May, while foreign buying was slightly lower. Net result was a decline of less than 4 per cent from the May total, according to National Machine Tool Builders' association, Cleveland.

Association's index for June was 211.6, compared with 219.8 in May, which was the highest in 25 months. June orders were 200 per cent above those for the same month last year.

Second quarter orders were 16.6 per cent above those for first quarter.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended July 15	Change	Same week 1938	Same week 1937
Pittsburgh ...	44	+ 8	25	88
Chicago	50	+ 5.5	32.5	84
Eastern Pa. ..	40	+ 8	27.5	68
Youngstown ..	53	+15	30	78
Wheeling	79	+17	46	91
Cleveland	43	+15.5	26	79
Buffalo	37	+ 4.5	35	88
Birmingham ..	80	+15	42	96
New England..	40	+ 8	35	78
Cincinnati	21	— 7	38	93
St. Louis	45	+14	18	93
Detroit	64	+ 8	29	97
Average....	50.5	+ 8.5	32	82

PRODUCTION

■ STEELWORKS operations last week advanced 8.5 points to 50.5 per cent, regaining most of the holiday loss. Eleven districts showed increases and one a loss. Last year the rate was 32 per cent; two years ago, 82 per cent.

Youngstown, O.—Up 15 points to 53 per cent, with possibility of further improvement this week, one interest planning to add an open hearth.

Chicago—Moved up 5.5 points from the holiday low to 50 per cent. All producers except one increased production, lack of rail tonnage causing the exception.

Detroit—Rose 8 points to 64 per cent, with 16 of 25 open hearths in production. One interest may add two more open hearths late in the month. Ford steelmaking has been steady since the first of March.

St. Louis—Increased 14 points to 45 per cent, highest rate since week of June 6.

Birmingham, Ala.—Advanced 15 points to 80 per cent, with 17 open hearths in production.

Pittsburgh—Resumption at all plants brought production up 8 points to 44 per cent. Further increase is scheduled for this week.

Wheeling—Back to the pre-holiday level, 79 per cent, 17 points above the preceding week.

Central eastern seaboard—Gained 8 points, averaging 40 per cent for the week.

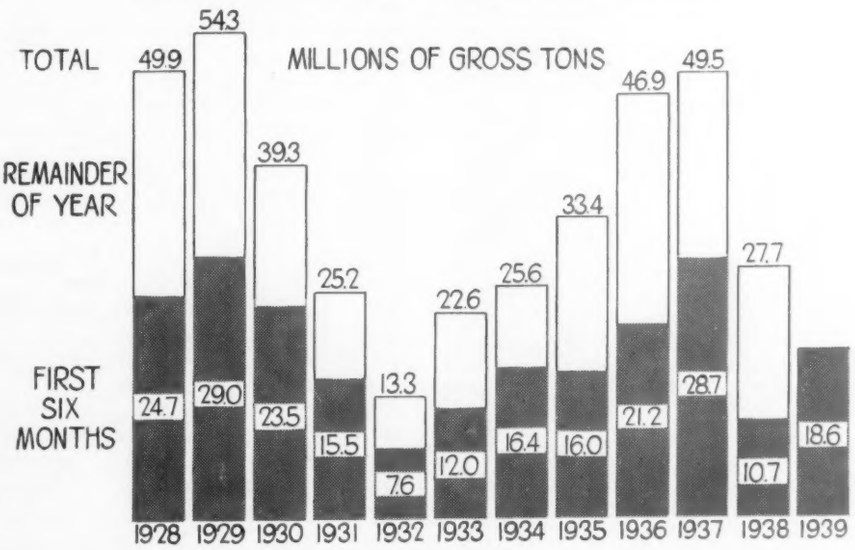
New England—Up 8 points to 40 per cent.

Buffalo — Addition of two open hearths by Bethlehem Steel Co. raised the district 4.5 points to 37 per cent.

Cincinnati—Declined 7 points to 21 per cent, due mainly to idleness of American Rolling Mill Co.'s Middletown plant for a mill installation.

Cleveland—Advanced 15.5 points to 43 per cent, following extensive holiday shutdowns. Republic Steel Corp. will begin operations in September in its foundry, moved from Beaver Falls, Pa., to plant of Newton Steel Co., Newton Falls, O.

First Half in Steel Ingot Production



■ **In seven of the past 11 years more than 50 per cent of the year's total output was made in the first six months; in three of the remaining four years, between 45 and 50 per cent; only one falling below 45 per cent. The proportion in 1928 was 49.5 per cent; 1929, 53.4; 1930, 59.8; 1931, 61.5; 1932, 57.1; 1933, 53.1; 1934, 64.0; 1935, 47.9; 1936, 45.2; 1937, 57.9; 1938, 38.6. Output in six months this year was 18,629,927 gross tons**

Steel Corp. Shipments Up 1.4 Per Cent in June

■ United States Steel Corp.'s finished steel shipments in June amounted to 733,433 tons, 10,268 tons, or 1.4 per cent more than 723,165 tons in May. Compared with 478,057 tons shipped in June, 1938, the increase was 255,376 tons, or 53.4 per cent.

Six months' shipments this year totaled 4,393,266 tons, 1,382,912 tons larger than 3,010,354 tons in the first six months last year, a gain of 45.9 per cent. Daily average rate in June was 28,209 tons, the best since March and third highest this year.

U. S. STEEL CORP. SHIPMENTS

(Inter-company shipments not included)

(Tons)

	1939	1938	1937	1936
Jan.	789,305	518,322	1,149,918	721,414
Feb.	677,994	474,723	1,133,724	676,315
March	767,910	572,199	1,414,399	783,552
April	701,459	501,972	1,343,644	979,907
May	723,165	465,081	1,304,039	984,097
June	733,433	478,057	1,268,550	886,065
July		441,570	1,186,752	950,851
Aug.		558,634	1,107,858	923,703
Sept.		577,666	1,047,962	961,803
Oct.		663,287	792,310	1,007,417
Nov.		679,653	587,241	882,643
Dec.		694,204	489,070	1,067,365
Adj.*		‡30,381	†77,113	†40,859
Total		6,655,749	12,748,354	10,784,273

*Yearly adjustment. †Deduction. ‡Increase.

Air-Conditioned Blast Furnace Now in Operation in Alabama

■ THE ENTIRE picture in southern iron-making may undergo a revolutionary change if the air-conditioning equipment just placed in operation at one of Woodward Iron Co.'s blast furnaces, Woodward, Ala., lives up to expected results.

The system was installed by Carrier Corp., Syracuse, N. Y., for the main objective of conquering the all-time enemy of furnace operations, humidity, and bids fair, according to those who watched preliminary operations, to achieve that long-sought end.

The process employs a spray type dehumidifier. Here the air passes through three sets of sprays of refrigerated water and is delivered to blowing engines which compress the dehumidified air and supply it to stoves for reheating after which the air is ready to enter the blast furnaces.

Temperature of air going to dehumidifier was 85 degrees Fahr. on the first day of operation. This air is cooled almost immediately to a predetermined temperature approximating 40 degrees Fahr. as a base. Heat removed from the air is absorbed by the sprayed water which is pumped through a 10-inch pipe line to a refrigeration plant in a building some 200-feet from the air intake. Here the heat content is removed from the water which is routed back to the sprays where the cycle is repeated.

Removes 20 Tons Water Daily

By this process 2700 tons of air per day are cooled to a constant predetermined dewpoint, then heated to a temperature of 1000 degrees Fahr. with no water added. Average is 20 tons of water removed from the air daily. This conditioned air then is blown at a pressure of from 5 to 30 pounds per square inch into the blast furnace.

Some 30 years ago, Gayley introduced the dry air blast by refrigeration, but the economics of that equipment would not allow its continuance, although technically the project was successful. However, control of moisture content appears possible on an economical basis with modern systems.

Likely one of the major results of this installation will be a more uniform product, together with more balanced continuity of operations due to greater stability of moisture content in air supplied to the furnace. This is expected to eliminate the severe handicap imposed on furnace operation by high humidity. Of far-reaching significance, according to technical men who have studied results so far, the new process is expected to prove doubly attractive because of the comparatively modest cost of approximately $75,000. Each furnace must have an individual air-conditioning unit.

H. A. Berg, president, Woodward Iron Co., has given no indication, either of additional expansions along this line or of results obtained thus far, it being expected the company will make a rather painstaking study of actual accomplishments before indicating results.

5233 Foundries In U.S., Canada

■ TOTAL number of foundries in the United States and Canada has continued to decline moderately since 1937, according to figures compiled by *The Foundry* for revision of *Penton's Foundry List.*

The United States now has 4776, a loss of 144 since 1937, and Canada has 457, a loss of six, making a total of 5233. The decline in number during the past two years has been at about the average rate noted since 1930.

Listing indicates a continuing trend toward consolidation and larger units equipped for mass production. A number of foundries have increased their range by adding units to make castings in more than one of the four main divisions of the industry.

Of the 5233 companies, 3244 operate their own machine shops and 3251 their own pattern shops.

In the United States slight increases were noted in the malleable, steel, exclusive nonferrous and aluminum casting shops. Summary:

	United States		Canada	
	1939	1937	1939	1937
Gray iron	3054	3070	340	356
Malleable	138	135	11	12
Steel	299	283	28	28
Nonferrous (exclusive)	1370	1360	92	81
Nonferrous (depts. of gray iron, steel, malleable)	1377	1390	209	206
Aluminum	2129	2117	251	272

Fourteen states showed increases in number of foundries. With two exceptions, these were in the West and South and generally were states having limited foundry operations. Largest gain was in Texas which added 17 shops.

Pennsylvania reports the largest decline but holds its position as leading foundry state with 560, or 31 fewer shops than in 1937. States with 100 or more foundries:

	1939	1937
1 Pennsylvania	560	591
2 Ohio	511	533
3 New York	393	416
4 Illinois	369	386
5 Michigan	313	324
6 California	274	294
7 Massachusetts	213	210
8 Wisconsin	202	208
9 Indiana	199	206
10 New Jersey	177	184
11 Connecticut	125	122
12 Missouri	113	111

Chicago continues the leading foundry city, with 153 concerns, ten fewer than two years ago. Cleveland with 108 regained second place from Los Angeles with 104. Ten leading cities:

	1939	1937
1 Chicago	153	163
2 Cleveland	108	113
3 Los Angeles	104	115
4 New York	98	100
5 Detroit	89	94
6 Milwaukee and West Allis	74	82
7 Philadelphia	69	76
8 Boston (Greater Boston)	58	59
9 St. Louis	55	58
10 Cincinnati	50	55

Toronto, Ont., leads Canadian cities with 47 foundries and ranks thirteenth in North America. Montreal, Que., is the second Canadian city with 32 shops.

Hoover Warns Engineers Of Unemployment Peril

■ Former President Herbert Hoover discussed contributions which engineering has made to human welfare, in speaking at Engineers' Day, Golden Gate international exposition, San Francisco, last Thursday. It was a feature of the American Society of Mechanical Engineers' semi-annual meeting, and Mr. Hoover was guest of honor.

"Your profession is to make things work," he said . . . "Something has gone wrong in the functioning of industrial life. Whether the sociologists, the economists and the politicians are wholly to blame, I shall not discuss. But we have gone through nearly nine years with seldom less than 11,000,000 of our fellow citizens without jobs.

"We are borrowing all the money to pay these gigantic deficits which unemployment causes. That road leads to bankruptcy.

"The only alternative to long failure of employment is dictatorship and the system of forcible co-ordination as a nation."

Offset Power Plant in Light-Weight Harvester Tractor Gives Wide Vision

■ NEW SMALL farm tractor of International Harvester Co., Chicago, was previewed last Wednesday by nearly 200 newspapermen, farm and technical writers, and agriculture college professors at the company's Chicago tractor works.

Designated the Farmall-A, machine weighs 1700 pounds, carries rubber tires exclusively, will sell at a base price of $515. It was designed and built, according to Sydney G. McAllister, company president, to provide complete tractor power for small farms and as a second tractor on larger farms. Available is a wide variety of implements and accessories specially designed for the new machine.

Reports from the Harvester company's 7000 tractor dealers, said Mr. McAllister, leaves no doubt there is a vast potential demand for a model of this type and size.

"We are in production on the Farmall-A now, and our production is rising rapidly. Our problem for several months is going to be to produce enough of the new tractors to fill the orders."

Will Recall Employes

Stepping up production schedules, he added, would mean the recalling of employes gradually with the expectation maximum employment will be reached by autumn.

Outstanding feature of the tractor's design is the location of the engine and operator's seat. Power plant is offset to the left of the long axis while operator's seat is to the right. This arrangement affords the operator a wide area of vision.

Another special feature of particular appeal to row-crop farmers is the adjustable rear wheel tread which permits the operator to set his rear wheels to fit the width of his rows. Wheels may be individually adjusted at 2-inch intervals to a range of from 40 to 68 inches. Minimum ground clearance is 21½ inches.

The Farmall-A has four forward speeds, three for field work and a fourth for farm or highway hauling. These range from 1½ miles an hour for cultivating delicate crops to a top speed of 10 miles an hour. A variable speed governor regulates the speed for field work.

Harvester company spokesmen say the new machine has excellent operating economy, operates at full load with maximum fuel consumption of one gallon per hour, on either gasoline or distillate. In many cases, they state, this will cut present costs in half.

Company will place on the market a new line of implements, including cultivators, plows, planters, middle busters, mowers, and others, all designed for the new light-weight tractor. With this diversification of tools, it is believed, the Farmall-A will be adaptable for use in every section, regardless of specialized types of farming.

A number of special attachments are offered. These include equipment for using distillate as fuel, a belt pulley, a power take-off, a lighting system for night operation, a muffler, a swinging drawbar, a front axle which permits adjustment of front wheels, and wheel weights for use when additional traction is needed.

Guests at the preview watched demonstrations of the tractor and its attachments in the plant yard, later witnessed a special sound movie showing the machine in action and illustrating its various operations and features. The writers were summoned to luncheon in the company's new modernistic dining hall by a 75-year-old bona fide farm dinner bell. The meal, incidentally, was the first served in the hall.

Mr. McAllister and Dale Cox, public relations director, welcomed the visitors.

"In developing this tractor," Mr. McAllister said, "we set out to meet the demand of farmers for a practical tractor which would also be modern in style, economical, efficient and low-priced. We have built into it a number of features making for greater safety. We have incorporated in it the advances made in recent years in metallurgy and industrial science.

"This new tractor, we are convinced, will give the farmer more comfort, economy, and efficiency for the price than he has ever obtained."

June Gear Sales 3 Per Cent Lower

■ Gear sales in June were 3 per cent lower than in May but 55 per cent above those for June, 1938, according to the American Gear Manufacturers association, Wilkinsburg, Pa. Association's index for June was 90, compared with 93 in May.

First six months of 1939 showed a 19 per cent gain over the comparable period of 1938.

■ **Innovation in tractor design: Power plant is offset to left while operator's seat is offset to right. In the Farmall-A, International Harvester's new light-weight model, this arrangement allows wider vision for row cultivation**

Sees Improvement in Tin Plate as Increasing Its Use, Creating Jobs

■ IMPROVEMENT in tin plate manufacture the last few years has opened up possibilities for greatly increased use of this product, asserted Dr. H. A. Baker, president, American Can Co., New York, in an address at a recent food conference at Massachusetts Institute of Technology, Cambridge, Mass.

The speaker indicated improved quality now resulting from new methods of manufacture combined with lowness of cast, will enable tin plate fabricators to utilize an increasing amount of this material to the end that there will be no technological unemployment, but more employment in the tin plate industry, as well as more employment in industries using this product.

In discussing improved manufacture of tin plate, he said: "I refer, of course, to large-scale continuous hot-roll and cold-roll reduction direct from 6000 to 8000-pound heated steel slabs, which are speedily turned into hot-band coils approximately one-tenth inch thick, which, when cooled and properly prepared, are then speedily reduced by cold-roll reduction to black plate in coil form a mile or more in length, one-hundredth inch thick, depending on gage or thickness required by tin plate specifications.

Allows Better Control

"Moreover, this process has given the manufacturer complete control of the chemical composition of steel so that can manufacturers' specifications can now be met. It is possible to produce low-phosphorus, low-silicon steel that was impractical by the old hot-pack or multiple folded sheet method, where the presence of phosphorus (often deliberately added for this purpose) was depended upon to keep the packs of sheets from welding together. Tin plate by this new method is susceptible to cold-roll tempering so that almost any degree of desired stiffness or softness may be obtained."

Dr. Baker said that at present many radically different materials, new synthetics, as well as improved older types, are elbowing each other in competition for the ever increasing markets for packaging materials.

"Without discussing the possibilities of these substitutes, I would like," he said, "to point out one interesting thing in regard to the peculiar suitability of tin plate for preserving foods in cans. This is that a tin container, hermetically sealed, holding a canned product, is not merely a steel container coated with a thin layer of metallic tin, but is also coated on the inside, in the case of many foods, with a protective minute hydrogen gas film, which electrolytically serves to prevent normal solubility of the metals and automatically removes residual traces of oxygen that might be left in the sealed can. . .

"It would be extremely difficult, if not impossible, to produce the same balanced type of protective coating with a combination of any other metals. The congenial marital combination of tin and steel has indeed been a happy one for the human race and particularly for those fortunate enough to live in America."

He also remarked that the canmaker has not been found wanting in developing machinery for high-speed utilization of tin plate, and that, although machinery has been profusely developed, the industry is not guilty of having produced technological unemployment.

Year's Taxes for 163 Corporations More Than Double Dividends

■ TAXES on industry last year amounted to almost two-thirds of net earnings, before taxes and dividends, and were more than twice the amount paid in dividends to common shareholders.

These are the conclusions of a survey of 163 corporations, having an aggregate of more than $40,000,000,000 in assets, 6,500,000 shareholders, and employing nearly 3,000,000 persons. Survey was by American Federation of Investors Inc., Chicago.

Taxes paid by the 163 companies in 1938 totaled $1,643,466,791, equivalent to $283 per common stockholder and to $576 per employe.

These taxes amounted to $2.73 on each share of common stock, while dividends on common stock averaged only $1.33.

Taxes consumed 61.6 per cent of net earnings before taxes for the 163 companies. Nineteen of these companies reported a deficit before taxes while the earnings of 15 others were wiped out by taxes, leaving net deficits for the year.

The federation's report particularly notes the burden high taxes placed on the steel industry and calls attention to the industry's $98,600,000 tax bill in 1938, contrasted with its net earnings of $83,727,000, before taxes and dividends. Deficit after taxes amounted to $14,879,000.

"Business leaders are coming more and more to recognize that only through the united support of their millions of stockholders, who constitute the great middle class, can they hope to overcome the effects of demagogic political appeals to class prejudice, and the socialistic efforts to discredit private enterprise in the hope of establishing autocratic government ownership of all industry," declares the federation.

"Workers in industry also are vitally concerned, for unless business is permitted to operate on a basis that will permit a fair margin of profit the system of free enterprise will break down and there will be fewer jobs and lower wages. This would increase the number of dependents and cut off their support by drying up the sources of taxation from which relief funds come."

EARNINGS STATEMENTS

Continental Steel Corp., Kokomo, Ind., reports first half net profit as $532,307, equal to $2.24 a share, compared with $211,300, or 63 cents a share, in the 1938 period. For the second quarter this year net profit was $253,128, substantially above net profit of $156,091 in the June quarter last year.

Copperweld Steel Co., Glassport, Pa., had net profit of $388,293 in the first half, equal to 90 cents a share on 431,714 shares of common stock. Billings in the period were the largest in its history, $4,311,582 against $3,012,274 in the first half last year. Its Glassport, Pa., plant is currently operating at approximately 75 per cent of capacity.

Truscon Steel Co., Youngstown, O., had a net profit of $143,531 in the second quarter. Net profit in the first quarter was $20,418, and net loss in the second quarter last year was $204,130.

United States Pipe & Foundry Co., Burlington, N. J., reports net profit of $1,434,916 for the six months ended June 30, against net profit of $778,294 in the comparable 1938 period.

•

Rustless Iron & Steel Corp., Baltimore, regular quarterly of 62½ cents on $2.50 convertible preferred stock, payable Sept. 1 to record Aug. 15.

What's New at Pittsburgh . . .

By R. L. HARTFORD
Pittsburgh Editor, STEEL

■ RECENTLY it was announced Hunter Steel Co., this city, would go into the ingot mold business, in an arrangement with Pittsburgh Coke & Iron Co., owner of 47 per cent of Hunter's common stock. Last week, however, it was stated the plans had been rearranged in an interesting three-corner deal between Shenango Furnace Co., Hunter, and Pittsburgh Coke & Iron. Under this arrangement Shenango will take over the ingot mold business.

This proposal, subject to approval by stockholders Aug. 15, will leave Hunter in the structural business with a greatly reduced overhead and a considerable increase in working capital.

Details of the agreement are unusual. Shenango, which owns jointly with Crucible Steel Co. of America several ore mines, will pay Hunter $1,187,000 for its Neville Island plant, payment to be made in ore as follows: $287,000 worth immediately, and the balance to cover nine notes for $100,000 each, maturing annually beginning Nov. 20, 1940.

Hunter will resell the ore at the same price to Pittsburgh Coke & Iron, whose blast furnace next door on the island will then produce pig iron which will be sold to Hunter, and resold at the same price to Shenango for ingot mold production.

Hunter has leased the part of its former plant devoted to structural work for $30,000 annually, plus $6000 annual taxes, and will continue in the structural business.

Shenango produces ingot molds through its affiliate, Shenango-Penn Mold Co., Sharpsville, Pa. With the addition of this new plant the company will be in a better competitive position in the Pittsburgh district, and will be able to ship by water, as the Hunter plant is fully equipped for river transportation, to a majority of the district's steel plants.

EIGHT PLANTS INSTALL NEW COLD ROLLING MILLS

Recognized need for cold rolling mills is resulting in a fair amount of new business for equipment makers. Now building or just completed are cold mills in at least eight plants.

Although some installations involve revamping old equipment to increase speed and output there also is a considerable amount of new equipment being installed. Several other companies have such programs but are delaying action because of financial details or business uncertainty.

Competitive situation on cold rolled products makes action imperative, and equipment manufacturers expect some of the now stymied projects will get under way before the year ends.

Export situation looks good to steel mill equipment manufacturers. Outstanding is an award of a $6,000,000 contract by Soviet Russia to Mesta Machine Co. for a sheet mill. Mesta will furnish equipment and technical assistance in construction and operation. Other export business is expected to come from Japan soon, although details are not yet available.

Weirton Steel Co., Weirton, W. Va., has completed work on its new structural mill. This unit now is running on initial heats. A wide variety of structural products will be rolled and the mill has been built so that it may be converted into a rail mill when and if the rail market becomes active enough to support it. This will require only the addition of a finishing stand.

CIO CONSIDERING ANOTHER ATTACK

Although the labor situation is quiet now, there is considerable speculation about what will take place in Chicago late this summer when CIO chiefs convene. Statements have already been made by Philip Murray, SWOC chairman, to the effect another attack on "little steel" will be considered. With some steelmakers anticipating a considerable improvement this fall, there is some apprehension in regard to labor.

When and if trouble appears, one club that certainly will be freely swung by the union henchmen will be the price cutting in steel. Most of the SWOC membership has been drilled in the fact the sales people aren't holding up their end of the business; that if steel prices had not come down and if price cutting had not appeared, balance sheets would be more favorable and there might be a better share for labor.

Some speculation is heard as to the effects of the next cut in hours to be made under the wages and hours law next fall. In October the work week is slated to drop to 42 hours from its present 44-hour level, and many salaried people are wondering how the reduction will be made. Several of the larger companies still are operating under reduced time arrangements, and one belief is that these will be made permanent.

■ Orders received by General Electric Co. in the first six months this year amounted to $169,071,646, compared with $128,223,823 in the same period last year, an increase of 32 per cent.

Graduate Apprentices Given Diplomas

■ Diplomas were presented to 14 apprentice graduates of 1939 classes conducted by Farrel-Birmingham Co. Inc., Ansonia, Conn., at commencement exercises June 12. The graduates included seven machinists, one patternmaker, one welder and five foundry workers.

Seven graduates of the 1938 classes were given special recognition and official diplomas. These included five machinists, one patternmaker and one foundryman. Presentation was by Albert S. Redway, vice president.

Nelson W. Pickering, president, extended greetings to the graduates and introduced C. Arthur DuBois, executive secretary of the training committee of Scovill Mfg. Co, Waterbury, Conn., who spoke on the value of apprentice training. The graduating class presented an American flag for use in the classroom. Illustration shows President Pickering addressing graduates and guests.

MEN OF INDUSTRY

■ W. R. CUNNICK, who has been located in Detroit as assistant vice president in charge of sales to the automotive industry for Weirton Steel Co., Weirton, W. Va., has been transferred to Weirton, and will be in charge of all sales activity.

♦

Charles H. Beard has been appointed general traffic manager of the operating companies of Union Carbide & Carbon Corp., New York.

♦

John J. McComb, vice president, Crucible Steel Co. of America, New York, has been named a director, Magnavox Co. Inc., Fort Wayne, Ind.

♦

A. J. Weith, director of research and development, Bakelite Corp., Bloomfield, N. J., has been appointed chairman, insulation committee, American Electrochemical society.

♦

H. Leigh Whitelaw, formerly vice president, American Gas Products Corp., has become associated with the Jones & Laughlin Steel Corp., Pittsburgh, in a sales capacity.

♦

Lincoln R. Scafe, former general manager, Fisher Body Co., Cleveland, a division of General Motors Corp., has become associated with White Motor Co., Cleveland, as sales manager, White Horse truck division.

♦

R. E. Howe, president, Appalachian Coals Inc., Cincinnati, has been appointed a member of the natural resources department committee, Chamber of Commerce of the United States.

♦

A. F. Colling, associated with the Texas Co., New York, since 1910, and for many years manager of the purchasing department, has retired. He has been succeeded by W. F. Moore.

♦

H. A. Schwartz, manager of research, National Malleable & Steel Castings Co., Cleveland, has been elected an alumni representative on the board of managers of Rose Polytechnic institute, Terre Haute, Ind.

♦

E. W. Dany has been named chief engineer, Ferro Enamel Corp., Cleveland. Harry Nee has returned to Cleveland after three years in the company's engineering department in England.

♦

William Blackie, heretofore supervising manager of the Chicago office, Price, Waterhouse & Co., accounting firm, has become associated with Caterpillar Tractor Co., Peoria, Ill., as controller.

♦

Robert I. Fletcher, formerly managing accountant with R. G. Rankin & Co., New York, has been appointed acting comptroller, Newport News Shipbuilding & Dry Dock Co., Newport News, Va.

♦

G. K. Dreher, Ampco Metal Inc., Milwaukee, was recently elected chairman, Milwaukee chapter, American Society for Metals. Other officers are: Vice chairman, Prof. J. F. Oesterle, University of Wisconsin; secretary-treasurer, E. G. Guenther.

♦

Raymond Loewy, New York, industrial designer, has been named a

H. Leigh Whitelaw

"Royal Designer to Industry" by the Royal Society of Arts of Great Britain. He is the first non-British subject to receive the distinction.

♦

Sam Fox, former manager of record protection division, Remington-Rand Inc., Buffalo, and later general sales manager, Mosler Safe Co., Hamilton, O., has been appointed general sales manager, Steel Storage File Co., Cleveland.

♦

A. M. Younger has joined the technical sales staff of Atlas Mineral Products Co., Mertztown, Pa., and will be in charge of sales in the Chicago area. Mr. Younger formerly was associated with the Chicago Flexible Tube Co.

♦

Carroll H. Henkel, metallurgist and chemical engineer, has joined the research staff of Battelle Memorial institute, Columbus, O., and has been assigned to the nonferrous metallurgy division. He formerly was metallurgist with Carnegie-Illinois Steel Corp.

♦

H. J. Babcock has joined the engineering staff of Ferro Enamel Corp., Cleveland. The past six years Mr. Babcock has served as technical consultant for the Tennessee Electric Power Co., and before that was industrial heating specialist, General Electric Co., Cleveland.

♦

Robert S. Brunhouse has been named sales manager of the recently created electric range division of Stewart-Warner Corp., Chicago, in addition to continuing in charge of the national housing and apartment house project division. Stewart-Warner electric water heater sales will also be directed by Mr. Brunhouse.

♦

Norman R. Entrekin has resigned his connection with the Wheatland Tube Co., Philadelphia, to resume consultation work, with offices in Philadelphia. For many years Mr. Entrekin was superintendent of Worth Bros., Coatesville, Pa., and later was general manager, Worth Steel Co., Claymont, Del.

♦

Charles H. Dench, veteran of 33 years' service with the lamp division of Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has been made division auditor. He succeeds Theodore J. Illing, who has retired after 51 years' service in the electrical industry, 27 of which were spent with Westinghouse.

♦

Ward W. Swarthout has resigned as factory manager, Universal Cooler Corp., Detroit. For 20 years he was associated with Sparks Withington Co., Jackson, Mich., in various capacities, including foreman of the pressed metal division, assistant to the factory manager, manager of the horn division, manager of refrigeration division, and head of the methods, engineering and time study division.

♦

George S. Neel, associated with Universal Atlas Cement Co., Chicago, the past 20 years in various sales capacities, has been named sales manager for the Chicago metropolitan area. Robert E. Fulton, formerly assistant sales manager of the company's Birmingham, Ala., office, succeeds Mr. Neel as sales manager in charge of the Iowa and Nebraska territory.

♦

E. G. Gardner has been appointed vice president in charge of manufacturing, and John F. Thomas, vice president in charge of sales,

National Enameling & Stamping Co., Milwaukee. Mr. Gardner was formerly vice president and works manager, Grand Rapids Brass Co., Grand Rapids, Mich., while Mr. Thomas heretofore has been manager, New York office, Braun & Co.

♦

N. A. Woodworth, formerly president, Ex-Cell-O Corp., Detroit, has formed a new company, N. A. Woodworth Co., 9111 Schaefer highway, Detroit. Associated with him are: E. W. LaMonte, formerly with Swartz Tool Products Co., and J. F. Benner, formerly with Partool Machine Co. The Woodworth company has acquired plant and facilities of Partool Machine Co.

♦

H. L. Andrews, since 1934 a vice president, General Electric Co., Schenectady, N. Y., in charge of the company's transportation activities, has been placed in charge of the appliance and merchandise department, with headquarters in Bridgeport, Conn. Associated with General Electric since 1910, he has had wide experience in engineering, manufacturing and sales departments.

♦

S. Horace Disston, vice president and general manager, Henry Disston & Sons Inc., Philadelphia, has been elected president. He succeeds Henry Disston, who has become chairman of the board. William D. Disston now is vice president in charge of purchases, sales engineering and new products development. Jacob S. Disston Jr. continues in charge of sales and sales promotion.

♦

N. B. Ornitz, a vice president and director, Blaw-Knox Co., Pittsburgh, has been elected president, American Gas Service Co., an affiliate of Blaw-Knox. L. W. Johnson has been made sales manager of the Gas Service company; Leo Ward, superintendent of construction and service; Vincent Evans, chief engineer; Edward A. Mayer, assistant treasurer, and Howard Phillips, credit manager.

♦

C. C. Limbocker, the past 20 years president, Wolverine Tube Co., Detroit, has been elected chairman of the board. H. J. Hooks, secretary and treasurer for 20 years, succeeds Mr. Limbocker as president. G. R. Anthony has been made vice president; O. Z. Klopsch, vice president and general manager; J. D. Colyer, vice president in charge of sales, and V. D. Hanna, secretary-treasurer.

♦

Roy Stephens, director of sales promotion, International Business Machines Corp., New York, has been promoted to executive assistant. Fred Boucher, assistant to vice president and general manager, has been made business service manager. Walter B. O'Donnell has been named sales manager, International Time Recording division.

N. A. Woodworth

♦

J. T. Gillespie Jr. has been appointed assistant to Thomas B. Hasler, president, Wilson Welder & Metals Co., an affiliate of Air Reduction Sales Co., New York. Mr. Gillespie, whose headquarters will be in New York, formerly was assistant manager, central division of railroad sales for Air Reduction Sales in Chicago, and in his new capacity will handle promotional sales activities.

♦

Harry Neal Baum, advertising manager, Fairbanks, Morse & Co., Chicago, has been elected president, Engineering Advertisers Association of Chicago, succeeding H. H. Simmons, advertising manager, Crane Co. E. A. Gebhardt, Commercial Advertising Agency; Frederic I. Lackens, Hays Corp., Michigan City, Ind.; and R. A. Peterson, Davis Regulator Co., have been made vice presidents, while John J. Rowell, Guardian Electric Co., was re-elected secretary-treasurer.

♦

Joseph Grace, formerly with Lempco Products Inc., Bedford, O., has been made sales representative in Kansas, Missouri, and part of Oklahoma and Arkansas by Maremont Automotive Products Inc., Chicago. Edward Boxer, heretofore with Eaton Products Inc., Cleveland, will take over New Jersey, Delaware and part of Pennsylvania, and Richard Price, formerly with W. D. Foreman Co., Chicago, will represent Maremont in the Chicago area.

♦

A. R. Boscow, since June, 1937, director of advertising and merchandising, Nash Motors division, Nash-Kelvinator Corp., Detroit, has been promoted to assistant to general sales manager. He will, however, retain executive supervision of advertising and merchandising activities. Richard H. Grant, formerly with Geyer, Cornell & Newell Inc., San Francisco, and who for the past two years directed Nash's advertising and public relations activities on the West coast, has been appointed advertising manager, with offices in Detroit.

♦

Jerome D. Kennedy, general manager of the distributing organization of Western Electric Co., New York, will retire Sept. 1, after 40 years active service with the company. He will be succeeded by Frederick W. Bierwirth, vice president of the company, and manager of its Kearny, N. J., works. Henry C. Beal, manager of the apparatus and cable division there, has been made Kearny works manager. Associated with Western Electric since 1912, Mr. Bierwirth advanced through various positions until his appointment in 1935 as vice president and works manager. Mr. Beal has been with the company 25 years, being made assistant manager of Kearny works in 1935.

DIED:

■ CHARLES McKENZIE THOMSON, 52, vice president and works manager, Canadian Tube & Steel Products Ltd., Montreal, in that city, June 19. Born in Edinburgh, Scotland, Mr. Thomson went to Montreal 25 years ago and had been vice president of the company nine years.

♦

John K. Beeber, an engineer for Lukenweld Inc., Coatesville, Pa., in an automobile accident recently.

♦

Walter K. Blakeslee, engineer with Fisher Body Co., Detroit, in that city, July 7. He was a member, Engineering Society of Detroit.

♦

John Z. O'Donnell, 58, assistant director, trade analysis division, E. I. du Pont de Nemours & Co., Wilmington, Del., July 5. He had been with du Pont since 1904.

♦

Robert S. Ahern, 48, sales manager, Cleveland Pneumatic Tool Co., Cleveland, in Birmingham, Ala., June 30. He joined the company in 1919 as manager of St. Louis office, going to Cleveland in May, 1934.

♦

Henry Hyer Whiting, 64, Berkeley, Calif., July 6. At one time he was treasurer, Columbia Steel Co., San Francisco, and later vice president and general manager, General Metals Corp., which he founded. He retired in 1933.

Windows of WASHINGTON

By L. M. LAMM
Washington Editor, STEEL

WASHINGTON

■ ADMINISTRATION leaders last week offered bills in both houses for the President's spending-lending program. Majority Leader Barkley proposed the self-liquidating projects bill in the senate while Representative Steagall introduced an identical bill in the house.

The measures would make available for nonfederal public works $350,000,000; self-liquidating express post roads and highway improvements, $750,000,000; rolling stock and shop equipment for lease to railroads, $500,000,000; rural electrification loans, $460,000,000, plus $40,000,000 already appropriated; self-liquidating farm tenancy loans $500,000,000, plus not more than $100,000,000 of funds already appropriated; loans through the export-import bank, $100,000,000.

Of the sums made available for the first time by this act, the President has estimated the following amounts would be spent in the current fiscal year: Nonfederal public works, $150,000,000; express post roads, $150,000,000; railroad equipment, $100,000,000; rural electrification, $20,000,000; farm tenancy loans, $250,000,000. Probably all of the $100,000,000 to finance foreign trade would be obligated if not disbursed during the current fiscal year.

Proposes No New Agencies

Bills would not create any new agency or disturb any existing authority. The money made available for nonfederal public works would be handled by the commissioner of public works; the money for express post roads and other highway improvements would be made available to the commissioner of public roads; money for railroad equipment would be handled by the reconstruction finance corporation; the rural electrification administration would receive the money for enlargement of that program; the department of agriculture would handle funds for the farm tenancy program, and the money for loans to facilitate exports would be made available to the export-import bank.

All disbursements would be for projects which are self-liquidating in character. The bills specifically impose upon each operating agency the responsibility to undertake projects and to make loans with the aim of recovering for the federal government the full amount invested plus interest sufficient to reimburse the government for the cost of the borrowing.

Maximum interest rate which may be charged by any operating agency would be limited, however, to the highest yield on the longest term direct or indirect obligation of the United States outstanding. At present, this would be approximately 2.3 per cent.

Loans Run 40 Years

Expectation is that all money paid out will be recouped by the federal government through repayment of public works, rural electrification, farm tenancy and foreign trade loans, through toll and other highway revenues and through rental of railroad equipment.

Because the obligations incurred will be liquidated by income from the program itself, these obligations may properly be segregated from other public debt obligations which are in large part dependent upon the federal taxing power for their ultimate repayment. The principal of segregating self-liquidating obligations of the federal government was established in the creation of the reconstruction finance corporation in 1932.

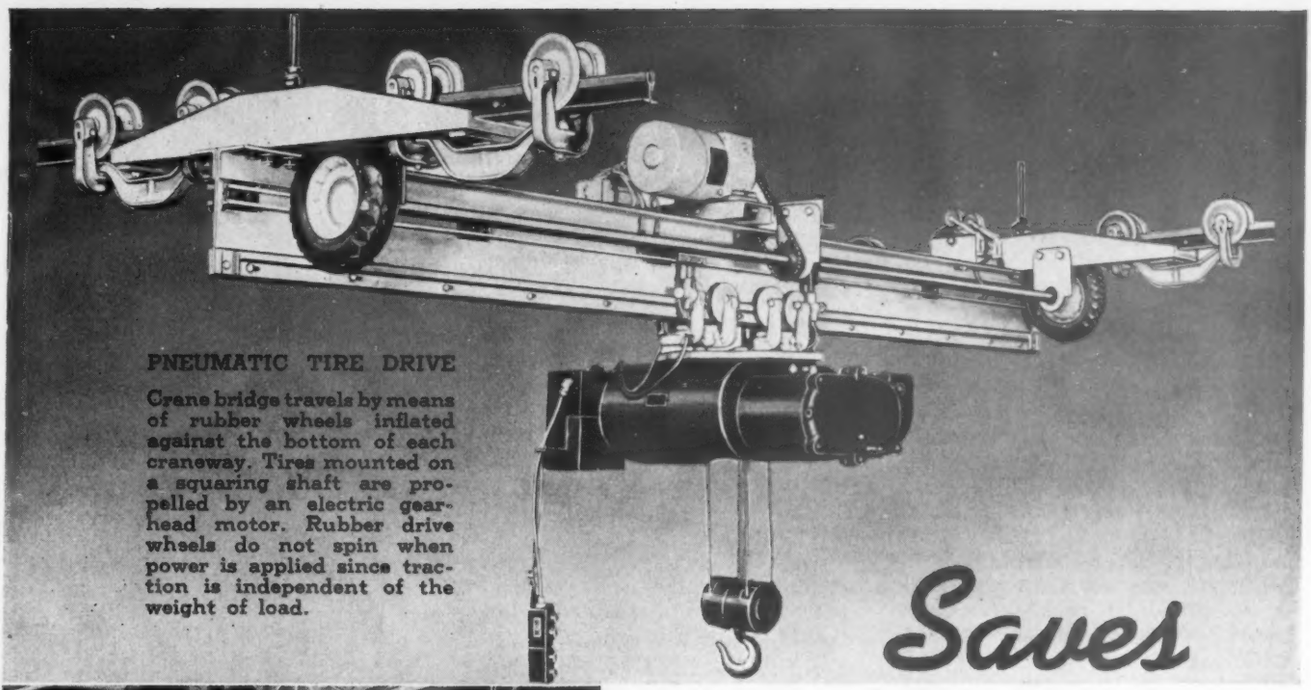
Therefore, to provide the funds for the program the amount of obligations which the reconstruction finance corporation is authorized to have outstanding at any one time would be increased by $2,700,000.000. This authorization would cover the $2,560,000,000 made available for the first time by this bill plus not more than $100,000,000 of the money already appropriated for farm tenancy loans and the $40,000,000 already appropriated for rural electrification advances. The latter two appropriations, already made, would be financed through the new setup to avoid any artificial division between the sources of money available for these two programs.

The reconstruction finance corporation also would be authorized to issue obligations having maturities up to 40 years so that the securities issued to finance the program may bear a proper relation to the life and amortization period of the improvements being financed. At present the reconstruction finance corporation cannot issue obligations having a maturity of more than five years.

All revenues and loan repayments collected under the program are required to be deposited with the treasurer of the United States for the account of the reconstruction finance corporation. The corporation can use this money to redeem the obligations which it has issued or it can use the repayments as a revolving fund to finance additional projects.

Appraise Assets Annually

To make doubly sure the program will be continually solvent, the secretary of the treasury and the federal loan administrator would be instructed by the act to appraise annually the assets held by the various operating agencies. To the extent, if any, that this examination indicates that the program will not be self-liquidating, the secretary of the treasury must secure from congress an appropriation for the account of the reconstruction finance corporation. Thus, if any losses accrue, they will be charged off currently, and the corporation will at all times have cash, current revenues and prospective income sufficient to service the indebtedness incurred for the program and to retire that indebtedness as it matures. Conversely, if there is any surplus, it will be used to reimburse the treas-

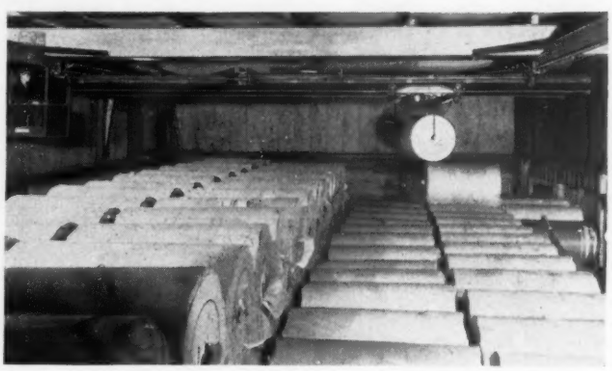


PNEUMATIC TIRE DRIVE

Crane bridge travels by means of rubber wheels inflated against the bottom of each craneway. Tires mounted on a squaring shaft are propelled by an electric gearhead motor. Rubber drive wheels do not spin when power is applied since traction is independent of the weight of load.

Saves handling cost

A single 1½ H. P. motor drives a 62 ft. crane.



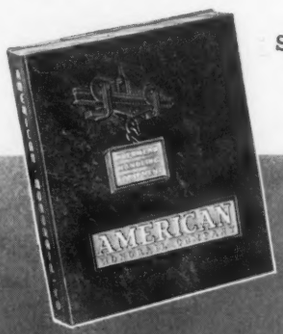
Crane requires little headroom for high piling.

Nearly every application of American MonoRail Cranes, whether hand or power operated, reduces the cost of handling heavy or cumbersome loads.

Cranes equipped with the American MonoTractor drive start immediately because traction is independent of the load. They move at variable speeds with lowest possible power cost. Horizontal or vertical movement can be controlled from floor or cab.

With the structural design greatly simplified, dead weight of the crane bridge is kept at the lowest point consistent with strength. This provides maximum live load capacity and requires less effort to move the crane. Elimination of friction at all points by the scientific use of proper bearings make American MonoRail cranes the easiest of all to handle.

You make no mistake in selecting an American MonoRail Crane. Let an experienced materials handling engineer consult with you on your next problem and offer definite recommendations.



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ury for any advances the treasury has made.

FREIGHT CLASSIFICATIONS WILL BE SIMPLIFIED

Complexities arising from the increasing list of commodities transported by rail has caused the traffic advisory committee, Association of American Railroads, to start work on further simplifying the classification of all products of industry and the rules which determine the application of the various classifications.

Out of this work is expected to come a condensed consolidated freight classification applicable to all sections of the United States. It should better meet the requirements of the public and railroads alike.

Under the general direction of the traffic advisory committee, the task is to be done by a special subcommittee of three. Subcommittee will meet in Chicago in July and in New York in August and thereafter will alternate between those two cities until the work is completed. Subcommittee members have been relieved of all other duties until their work is finished. They have full power to put into effect changes in the classification which do not affect charges paid by shippers. Changes which do affect shippers' charges are to be docketed for public hearings, to be held in New York, Chicago, and Atlanta.

LABOR BOARD MAY CHANGE ADMINISTRATIVE RULES

National labor relations board intends soon to make additional changes in its administrative rules to offset criticism made before the house and senate committees holding hearings on the labor act.

Senator Ellender, Louisiana, acting chairman of the senate labor subcommittee, last week said he understood the board would adopt new rules of evidence before trial examiners.

Senator Burke, Nebraska, who has led the fight to amend the labor law, said he also had heard reports the board was contemplating additional changes. It already has announced revision of procedure to permit employers, in certain cases, to invoke the board's services in jurisdictional union disputes.

Both Senators Burke and Ellender agreed there is little likelihood the Wagner act will be amended at the present session.

Senator Ellender said he was informed that the labor board was studying the possibility of giving greater latitude to independent unions not affiliated with AFL or the CIO, where these unions deal with several employers.

Senator Burke said his group still favored modifying the act. He has proposed amendments which would give employers access to the board's services, prohibit coercion of employes from any source and make other fundamental alterations in the law.

Another of Senator Burke's amendments would direct the NLRB to adopt rules of evidence followed by federal courts for the board's preliminary hearings.

PATENT BILLS OUTGROWTH OF HEARINGS BY TNEC

Five new patent bills, aimed at speeding up the patent process and recommended by Patent Commissioner Coe at hearings before the temporary national economic committee, were passed last week by the house.

One measure gives the patent commissioner the right to demand patent applicants answer his letters within a month instead of the present limit of six months. Another requires a person wishing to contest a patent on the claim he is the prior inventor must file application within a year—instead of two years—after patent is granted.

A third bill eliminates one of the steps in appealing decisions of the patent office. Another requires speedier payment of the final fee. The fifth bill gives inventors only a year's leeway—instead of two years—between making inventions public and applying for a patent.

In addition to the house action, two patent bills were reported to the upper house by the senate patent committee. These, according to Senator O'Mahoney, TNEC chairman, were the direct outgrowth of the testimony given before his committee. Senate bills provide for a new circuit court of patent appeals and for the limitation of the life of a patent to 20 years from the date the application is filed.

ORDERS NEW SYSTEM OF GOVERNMENT PURCHASING

The White House has issued an order, effective immediately, that government supplies, except in a few instances, are to be purchased by the procurement division of the treasury department.

Also a possibility is that future government purchases may be affected by legislation now pending in the senate. Senator Walsh, Massachusetts, introduced a bill amending the Walsh-Healey public contracts act by extending coverage to government contracts in excess of $4000, instead of $10,000 as the act now stipulates. The Walsh bill also provides for amending the minimum wage provisions of the present act by requiring that the basic minimum wage be not less than the minimum wage required to the applicable section of the fair labor standards act, and requiring contractors to conform to such standards.

ASKS APPROPRIATION FOR STRATEGIC MINERALS

President Roosevelt last week asked the house for an appropriation of $25,000,000 for the fiscal year ending June 30, 1940, "to remain available until expended," for the use of the procurement division of the treasury department "for the purchase, storage, maintenance, and rotation of strategic and critical minerals essential to national defense."

The so-called strategic minerals act, which was approved June 7, authorized the purchase of materials amounting to $100,000,000 over a 4-year period, but no actual appropriation was provided in the bill.

SENATE GROUP STUDIES EMBARGO RESOLUTION

Senate foreign relations committee last Friday considered the Pittman resolution which would embargo exports of arms, ammunition and implements of war, iron, steel and scrap metals to those countries violating the nine power treaty—in other words to Japan.

Committee requested an opinion from Secretary of State Hull on whether or not passage of the resolution would conflict with the nine power treaty and delayed other action pending Mr. Hull's opinion.

GOVERNMENT IRON, STEEL AWARDS TOTAL $1,862,364

During the week ended July 8, the government purchased $1,862,363.96 worth of iron and steel products under the Walsh-Healey act as follows: Lukenweld Inc., Coatesville, Pa., $60,948; Bantam Bearings Corp., South Bend, Ind., $149,640.20; Chas. F. Guyon Inc., New York, $14,348.79; Bethlehem Steel Export Corp., New York, $44,009.12; Henry Disston & Sons Inc., Philadelphia, $1,424,089.40; Lukens Steel Co., Coatesville, Pa., $78,042.60; Stewart Warner Corp., Chicago, $33,930; Dixie Metal Products Co. Inc., Birmingham, Ala., $15,600; American Bridge Co., Denver, $12,260; Blaw-Knox Co., Pittsburgh, $15,687.55; and The Columbia Machine Works & Malleable Iron Co., Brooklyn, N. Y., $13,808.30.

Purchases for the week ended July 1 included: Edge Moor Iron Works, Edge Moor, Delaware, $237,320; Lalance & Grosjean Corp., Washington, $52,300; Electric Industrial Equipment & Supply Corp., Baltimore, $10,810.20; Himelbau, Byfield Co., Chicago, $20,936.16; Crane Co., Washington, $12,289.80; Denman & Davis, North Bergen, N. J., $11,048.40; Allegheny Ludlum Steel Corp., Pittsburgh, $13,881.06; and South East Joslyn Co., Cincinnati, $11,885.94.

AVIATION

AIRPLANE INDUSTRY TO BOOST OUTPUT 30% IN SECOND HALF

■ GOING into the second half of 1939 with output and earnings at record levels, leading aircraft builders expect to step up production an average of 30 per cent. This will bring operations for the period 80 per cent over the final six months last year.

Industry's backlog of unfilled orders currently exceeds $260,000,000, compared with approximately $160,000,000 as of Jan. 1. Most heavily booked is Douglas Aircraft Co. Inc., Santa Monica, Calif., with orders amounting to $48,000,000.

Deliveries by Glenn L. Martin Co. are scheduled for remarkable gains. This company's plant at Middle River, Md., during the first six months this year turned out planes totaling $5,500,000, while second half shipments are estimated at $24,500,000. In all 1938, previous peak year, output was but $12,417,000.

Establishing a new record for production of commercial craft, Piper Aircraft Corp., Lock Haven, Pa., built 712 lightplanes during the first half. This nearly equals its entire output for 1938.

Preparing to expand its facilities with a one-story assembly addition is Stinson Aircraft division of Aviation Mfg. Corp., Wayne, Mich. Firm has a $1,500,000 order for army observation planes.

Contracts have been let by Curtiss-Wright Corp. for constructing two extensions, 90 x 100 feet and 152 x 273 feet, to the Clifton, N. J., factory of its Curtiss Propeller division. Total cost is estimated at $150,000. The company plans to transfer production of small type planes from its St. Louis Airplane division to Curtiss Aeroplane division, Buffalo. Unit at St. Louis will concentrate on large twin-engined transport craft.

Army air corps soon will place construction and equipment awards for a two-story, 50 x 200-foot power plant laboratory at Wright field, Dayton, O.

Study Air Corps Procurement

Thirty representatives of the aircraft industry met last week in closed conference with war department officials in Washington, mapped their role in industrial mobilization and discussed air corps procurement methods. Roundtables on specific problems followed a general session headed by Assistant Secretary of War Louis Johnson and Maj. Gen. Henry Arnold, air corps' chief of staff.

Competitive bidding on government aeronautical contracts may be abandoned under a bill introduced in the house last week. Its passage urged by the administration, this measure would permit the war and navy secretaries to allocate aircraft orders on a "cost-plus" basis. It is felt negotiated contracting must supplant the present lowest-bidder system if awards are to be distributed broadly enough to engage all available capacity, preventing a few plants from becoming jammed with orders while others are idle.

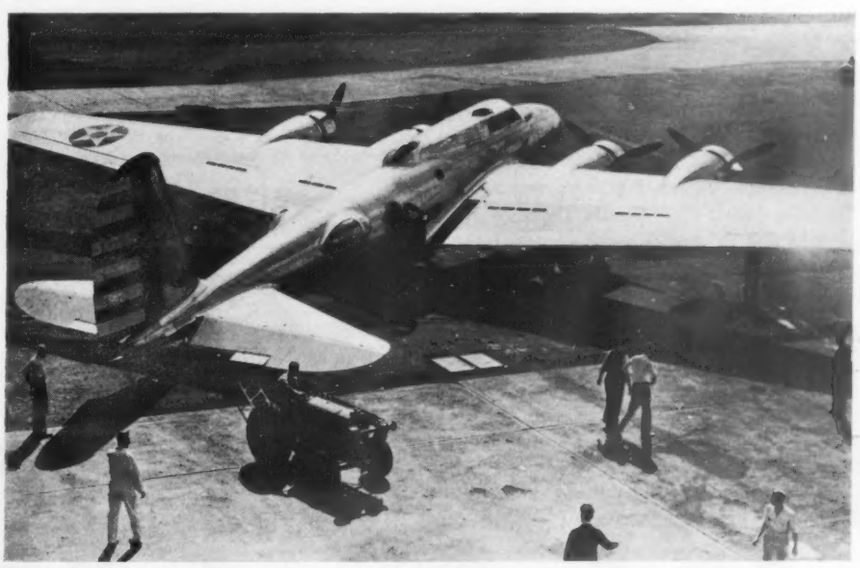
In bidding just closed by the air corps, Bellanca Aircraft Corp., New Castle, Del., was lowest bidder for twin-engined interceptor pursuit planes. Bell Aircraft Corp., Buffalo, was sole bidder on multiplace fighters. For twin-engined bombardment craft Douglas Aircraft was low on lots up to 90, North American Aviation Inc., Inglewood, Calif., low on larger quantities. Eleven manufacturers submitted offers for primary trainers.

Federal allotments for equipment have been booked by: Wright Aeronautical Corp., Paterson, N. J., engines, $431,529, parts and tools, $400,000; Sperry Gyroscope Co. Inc., Brooklyn, N. Y., instruments, $393,812; Scintilla Magneto division of Bendix Aviation Corp., Sidney, N. Y., magneto parts, $120,000; Curtiss Propeller division of Curtiss-Wright, Clifton, N. J., propeller blades, $103,540; Hamilton Standard Propeller division of United Aircraft, East Hartford, Conn., propellers, $74,424; and Grumman Aircraft Engineering Corp., Bethpage, L. I., parts, $17,997.

Recently organized in Los Angeles, Hardman Metal Products Co. proposes to fabricate metal airplane parts. Company is headed by Frank Hardman, formerly factory superintendent for Northrop Aircraft Corp.

X-ray equipment costing $150,000 is employed by Lockheed Aircraft, Burbank, Calif., to test physical qualities of all cast and forged parts for its planes. No failure of an X-rayed component has yet been recorded, it states. This firm is said to be the world's largest industrial user of the X-ray.

Bomber with Railroad-Train Power



■ Latest in giant bombers is this all-metal Boeing "flying fortress", first of 39 being built for army air corps at cost of $10,000,000. Four Wright Cyclone engines propel the 22-ton craft with an aggregate 4000 horsepower, whereas but 4700 horsepower draw the New York Central's streamlined 13-car Twentieth Century Limited, weighing with its locomotive some 1070 tons

GREAT BRITAIN USING MORE ALUMINUM ALLOYS

Increasing use of aluminum alloys by the aircraft industry and to a lesser extent by the automobile and engineering industries of Great Britain has resulted in a sharp increase in its aluminum imports, according to a report to the commerce department.

Imports of aluminum from Canada and Switzerland, the two outstanding supplying countries, were valued at $6,540,000 during the first four months of 1939, a nine-fold increase compared with the first four months of 1937 and a 56 per cent increase compared with the corresponding period last year.

It is estimated consumption of aluminum in all forms in Great Britain during the first quarter this year was approximately 35 per cent higher than in the corresponding period of 1938.

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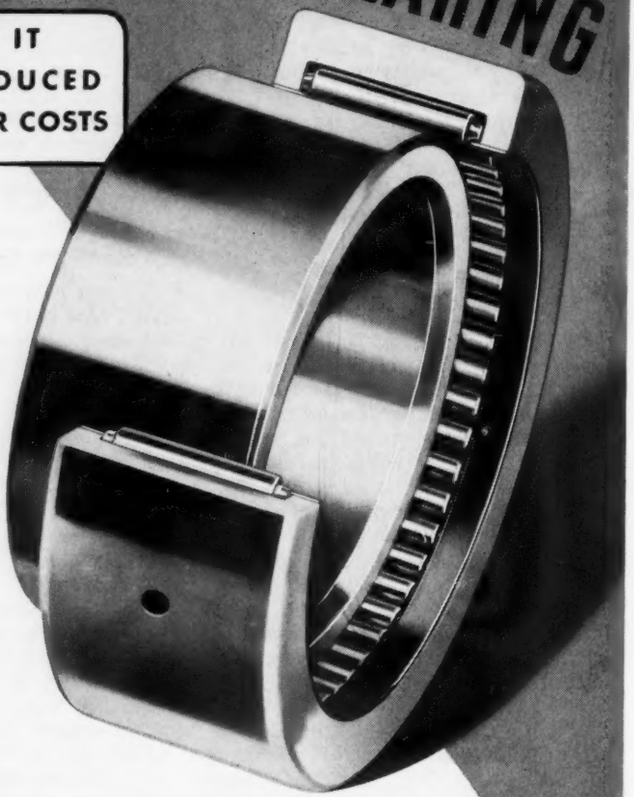

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BANTAM'S new-type Standard Series Quill Bearings have scored a phenomenal *sales success* based solely on *operating success*. In a wide range of industries they have proved their ability to solve bearing problems of long standing. Repeat orders prove the satisfaction of users who write us enthusiastically about savings in cost and improvements in performance.

This new type Quill Bearing is built to the same high quality standards as the Bantam Quill Bearings used on Diesel-powered streamline trains. The design is greatly simplified. There are no fragile parts—no possibility of failure. New method of roller retainment provides for quick, easy assembly. End thrust is taken on the ribs of the one-piece channel-shaped outer race. Correctly proportioned rollers with husky curvilinear trunnions insure longer service.

For complete engineering data, write us for Bulletin 103H. For Needle Bearings to be used in lighter service write our affiliate, The Torrington Company, Torrington, Conn., and ask for Circular 21A.

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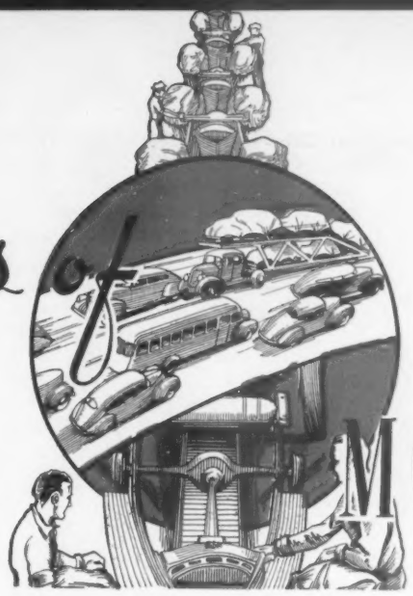
BANTAM BEARINGS

Mirrors of MOTORDOM



By A. H. ALLEN
Detroit Editor, STEEL

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DETROIT

■ NEW concepts in automotive and aircraft motor designs are being pioneered by several engineering organizations in this area, also by the motor companies themselves, as mentioned briefly in this department some months ago. One such interest, which has been pursuing this development work for the past 14 years, is Skinner Motors Inc. (Delaware), whose research has been directed toward evolving engine designs which would operate satisfactorily on higher octane fuels, show better economy and provide more horsepower per cubic inch displacement.

Fuels with octane rating of 100 are now available for aircraft engines, permitting compression ratios to be increased appreciably, with resultant greater horsepower and higher speeds. Skinner designs are based on the use of slide-sleeve valves to give quieter operation, positive valve action and lower engine temperature. These sleeves or valves may be either the split or semicylindrical type driven by means of a connecting rod attached to an auxiliary crankshaft.

Use of Sleeve Valves

In the two-cycle engine, the sleeve operates at one-half engine speed, opening and closing exhaust ports at the top of the cylinder, the intake ports being operated by the piston. This gives an excellent uniflow principle of cylinder scavenging.

Split sleeves work equally well in various types of four-cycle engines developed. One valve is used to open and close the exhaust ports, the other the intake ports. Only one auxiliary crankshaft is required, driven through gearing with the main crankshaft. Valves used so far have been of centrifugally cast molybdenum iron; they travel between the cylinder block and an inner sleeve or cylinder in which the piston travels. It is proposed eventually to use nitrided steel valves because of their lesser cost and longer life.

On a fuel injection spark ignition test engine using diesel No. 3 fuel, run wide open for 1000 hours, no perceptible wear was noted on the slide valve. The valves range in thickness from 0.040 to 0.070-inch.

A typical case involving the use of the slide valves in an automotive engine shows some interesting results. A 6-cylinder plant with 228 cubic inch displacement showed an increase in horsepower of from 95 with conventional poppet valves to 121 with the slide valves. Compression ratio was 7.7 to 1, using 70 octane fuel.

Lower Cost Per Horsepower

Analysis shows the unit cost of the slide valve engine is about 6 per cent more than the conventional engine of equivalent size but, due to the increased horsepower output, the actual cost per horsepower is considerably less and, after all, horsepower output is what the average designer works toward.

The positive valve action, regardless of speed, makes such an engine ideally suited to aircraft installations, and a number of different types of engines embodying the principle have been built, including both in-line and radial designs.

A recent job is an in-line type with inner sleeve or cylinder liquid cooled. This is accomplished by the use of double helical grooves on the outside of the inner cylinder wall. The inner cylinder with these grooves is surrounded by a thin shell, steel or cast iron, arranged so that the coolant passes up one of the double helical grooves and down the other. A Prestone type of coolant usually is used. This grooving is said to be an improvement over any present design of cylinder, because of the more effective cooling of the inner cylinder which avoids cylinder distortion and makes possible the elimination of any out-of-round condition in the cylinder which might cause excessive blow-by and ring sticking.

A typical radial design indicates the possibility of effecting a 27 per cent reduction in frontal area with equivalent cylinder displacement, another important consideration from the standpoint of aircraft.

Success of the Argyle sleeve engine in England, built by the Bristol Aeroplane Co., has stimulated interest in nonpoppet-valve engines in this country and it is understood the larger airplane engine builders in the United States are conducting experiments now with the Argyle engine. The Skinner engine is claimed to have advantages over the Argyle, since it is possible to cool the inner liner or cylinder and increase the intake and exhaust port areas so that better breathing and scavenging can be realized. Packard Motor Car Co. is reputed to be in the midst of an extensive development program on this type of engine for various governmental agencies.

Foresees New Type Engine

Ralph L. Skinner, associated with the slide valve engine since its inception, says: "There is no question in my mind but that, with the possibilities of the high octane fuels coming into general use in the next few years, some new type of engine will be developed to meet the need and obtain the real advantages from the fuel development.

"While it is true some improvements have been made in the past few years in the poppet-valve engine's performance, at the same time there is a limiting factor in this type of engine, due to the port areas of the valve and the speed at which the valves will function properly. In the

nonpoppet-valve engine, an important advantage is noticed in the elimination of the hot exhaust valve, which apparently has a prominent effect on the possible compression ratios of the engine."

■ THE EARLY part of this year mention was made here of a new type of headlight bulb under development for automotive use. It appears now that practically all makes of cars will adopt this type of headlamp which is known as a fixed-focus, hermetically sealed type of unit. Essentially it comprises a new type of bulb and reflector mounted in a sealed housing with a focusing lens. The bulb has several times the life of previous headlamp bulbs and when burned out or broken the entire unit is replaced, at a reported cost of $1.35.

General Electric, C. M. Hall Lamp Co., Guide Lamp division of General Motors and Electric Auto-Lite will be the principal sources for the new lamps, with Ford probably making his own. Main advantages of the equipment are said to be the longer life and especially the nonglare qualities. By suitable arrangement of bulb and lens, practically all the light is directed down onto the road, athough two beams are still provided, for near and distant road illumination. The lamps should prove a valuable contribution to road safety at night.

Lamps provided by the different sources are not identical. One type, for example, will not operate once the lens has been broken. Another type will continue to function even in event of breakage of the glass. A committee of the Society of Automotive Engineers is drawing up specifications for the equipment, and an industry committee has been collaborating with some of the sources of supply for several months.

■ FOLLOWING the outbreak of fighting at the Pontiac Motors and the Fisher Body plants in Pontiac where a picket line of some 450 UAW-CIO adherents prevented production workers from going into one plant, a midweek conference was held between William S. Knudsen, GM president, and Philip Murray, CIO vice president, wherein a meeting of committees representing the union and the management was arranged in an effort to settle the dispute which has thrown several thousand GM tool and diemakers out of employment. Murray apparently came to Detroit at the request of federal conciliator James F. Dewey who has been attempting to work out a settlement.

Meanwhile the strike took a new tack last week when union members in tool and die jobbing shops were ordered to stop work on General Motors parts. This was done in several shops and was met with strong protests from managements of these companies.

State police arrived in Pontiac Wednesday and kept a firm hand on a situation which earlier threatened to get out of control. Picketing was restricted to groups of ten, and order was restored. In Detroit, union leaders said they were mobilizing members of other locals to "pour in" on Pontiac to make sure the Fisher plant there was kept closed.

Walkout of cutter grinders in the Chevrolet Gear & Axle plant here threatened to tie up production work still in process on 1939 models. Tools and other equipment were getting in poor shape, but they lasted through the week which saw the end of the run on 1939 model parts. This would indicate Chevrolet assembly lines will be running for about two weeks more before the shutdown for model changeover.

■ "A COMPACT organization within the world's most compact organization" is the way one observer describes the new setup of the Ford tractor plant. Closely supervised by Harry Ferguson from Ireland, the Ferguson-Sherman Mfg. Corp. has been installed in the B building at the Ford plant, with executive offices and display rooms already occupied. Ferguson has enlisted a staff of assistants from England and Ireland who are thoroughly familiar with the new tractor, and proposes to institute a specific course of training which will be given to the entire personnel eventually.

Sales manager is Hugh Jenkins, from California. An interesting angle is that sales will be concentrated solely in the farm field, and no attempt will be made to invade the industrial tractor market. In other words, Ferguson is out, as he says, to "displace the horse" and all his efforts will be made in that direction. Ford dealers in rural areas will not automatically become tractor distributors; first they must prove they have the capital and sufficient interest in and knowledge of the agricultural market.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1937	1938	1939
Jan.	399,186	227,130	353,946
Feb.	383,900	202,589	312,141
March	519,022	238,598	389,489
April	553,231	238,133	354,263
May	540,377	210,183	313,214
June	521,153	189,399	*308,281
6 mos.	2,916,869	1,306,057	2,031,334
July	456,909	150,444	.....
Aug.	405,072	96,936	.....
Sept.	175,630	89,623	.....
Oct.	337,979	215,296	.....
Nov.	376,629	390,350	.....
Dec.	347,349	407,016	.....
Year	5,016,437	2,655,777	.....

*Estimated.

Estimated by *Ward's Reports*

Week ended:	1939	1938†
June 17	78,305	41,790
June 24	81,070	40,918
July 1	70,663	40,945
July 8	42,784	25,375
July 15	61,610	42,010

†Comparable week.

	Week Ended July 15	Week Ended July 8
General Motors	18,425	13,775
Chrysler	18,320	13,980
Ford	18,500	10,800
All others	6,365	4,229

MEETINGS

BRITISH ENGINEERS WILL VISIT IN UNITED STATES

■ A PARTY representing the Institution of Mechanical Engineers of Great Britain will visit the United States in September to join with the American Society of Mechanical Engineers in a series of meetings in New York. At the same time, members of the Institution of Civil Engineers and Engineering Institute of Canada will meet in New York with the American Institute of Civil Engineers. Both British groups will arrive in Boston Sept. 3.

The mechanical engineers will hold sessions on four consecutive mornings as follows: Sept. 5—marine transport; Sept. 6—light-weight, high-speed trains; Sept. 7—highway transportation; and Sept. 8—transatlantic airplanes. Time will be arranged for visits to the New York World's fair and to industrial plants in the New York area.

Upon conclusion of the New York meetings, the British engineers will visit Niagara Falls, Toronto, Detroit, Cincinnati, White Sulphur Springs, Washington and Philadelphia.

PORCELAIN ENAMELERS PLAN FOURTH ANNUAL FORUM

Fourth annual forum of the Porcelain Enamel institute will be conducted at Ohio State university, Columbus, O., Oct. 18-20. The program will be arranged to appeal to shop men in the porcelain enameling and related industries. Sessions will deal with fine-ground enamels, cast iron enameling, sheet steel enameling, and hollow ware, as well as general practice. Forum headquarters will be at the Deshler-Wallick hotel where a banquet will be served on Oct. 19.

Photo courtesy Braeburn Alloy Steel Corporation, Braeburn, Pa.

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A product of modern research—that's a true description of Norton Resinoid Wheels for billet and foundry grinding. In the Norton laboratories there's a group of scientists that specializes in resinoid bond development. Not only have they made many important improvements in the bond formulae but have also developed an elaborate control system that improves production quality and uniformity.

These laboratory developments coupled with an entirely new production department with the very latest available equipment have resulted in new standards of quality for resinoid wheels — wheels that are cutting billet and foundry grinding costs. Let Norton engineers study your jobs and give you the benefit of these improved wheels.

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NORTON ABRASIVES

"Prejudice Retards Welding Progress, Prevents Fabricating Economies"

By J. F. LINCOLN
President, Lincoln Electric Co., Cleveland

■ THE welding industry is suffering from too many parents. Each parent wants to make the rules of conduct. The difficulty is that no two parents agree on how to raise the child.

Many people are attempting to make standards for welding without sufficient knowledge of the facts. Many people also are sure of a great many facts about the subject, the only difficulty being that these facts are just not so.

That welding has lived through its childhood under these conditions and grown to manhood is remarkable and shows how strong is its constitution.

Welding must have parents but there should not be so much doubt thrown on its paternity. Standards of conduct are necessary but they must be founded on fact and need.

There is no doubt that a great deal of the work which has been done to perfect and test welding, has been helpful. It is necessary, however, that any standards be founded on fact rather than fiction. The following facts are learned from experience:

1. The shielded arc deposited metal is definitely stronger than mild steel plate under all conditions.

2. The shielded arc weld metal is a good deal more homogeneous than mild steel plate, hence less apt to defect.

3. The making of a weld with the shielded arc requires very little skill, particularly in the downhand position. The chance of that weld metal being as good as the parent metal is tremendously better than the chance of the parent metal being as good as the weld.

Unnecessary Limitations Imposed

In spite of these facts we still have any number of people in positions of authority who insist on limitations, which are neither necessary nor intelligent. For instance, the interstate commerce commission insists that to weld a tank car which carries liquids at no pressure, is dangerous. The fact that the tanks into which the oil goes from these tank cars must be welded to remove the chance of leakage, does not effect them. The further fact that this oil was distilled at a pressure of over 1000 pounds per square inch at over 1000 degrees Fahr. in an arc welded vessel, disturbs them not at all.

The interstate commerce commission still insists that a locomotive boiler cannot be welded although the locomotive super heater which carries the same steam pressure at a higher temperature in the same boiler, must be welded.

Authorities still insist that the skin of a ship shall not be welded in spite of the fact that the boilers inside the ship, carrying very high pressures, are welded. They still insist that many pressure vessels must be riveted because of the danger to life and yet 30,000,000 automobiles in this country depend for their success on untested welds. The failure of any automobile weld would result in much greater loss of life than would be true of failure of many pressure vessels. In spite of all these facts welding is condemned or so restricted as to eliminate its economies.

This condition is not unusual. Perhaps because welding is a new industry the added care which these frequently silly requirements enforce is in the right direction, but unless this insanity is stopped at some reasonable point, the cost of fabrication will be unnecessarily and unduly increased.

The statement is often made that welding is all right provided the man who does the work is sufficiently skilled and careful. In many cases the operator must be tested every few months, or even days, in order to satisfy the inspector. It is doubtful if this is necessary. It is probably a good deal more difficult to make a weld which is worse than the parent metal than it is to make one which is better. With proper electrode, proper size and type of welding machine, and proper oversight by the foreman, it is a practical impossibility for any weld to be made which will not be better and more reliable than the metal itself. This is information which many people will question. In order to determine the facts in connection with this matter 14 men in the class of the welding school of the Lincoln Electric Co., entered on March 27, 1939, who had never had any welding experience whatsoever, were selected to make a certain test. These were followed by an equal number April 3 for the same test.

Plates to be welded were properly prepared. The welding machine was properly set and the proper size of electrode was given to the operator. He was given 15 minutes' instruction in holding the arc. He then proceeded to make a standard test sample of all deposited metal of ½-inch diameter and a length of something more than 2 inches, with two ends arranged for clamping in a standard tension machine. At the end of two weeks he made another sample in exactly the same way, and at the end of his course, i.e., four weeks, he made the third sample. The following averages speak for themselves:

Tensile Strength	Elongation	Tensile Strength	Elongation	Tensile Strength	Elongation
First Week		Second Week		Fourth Week	
		A. M. Class, March 27			
66,350	19.7%	65,185	23.6%	65,557	28.4%
		P. M. Class, March 27			
66,100	27.2%	66,264	30%	63,392	32.2%
		A. M. Class, April 3			
66,821	23.9%	65,185	23.6%	63,515	27%
		P. M. Class, April 3			
65,144	31.7%	66,264	30%	63,400	29.6%

The following conclusions can be drawn from these facts:

1. These welds made by novices who had never had any experience before would have withstood all commercial requirements.

2. A very wide variation occurs in these tests. These are caused largely by the impurities in the plate being carried over into the deposited metal, not by difference in skill.

3. The weld metal is under all conditions better than the parent plate.

We can be assured from these tests that there is no reason for many of the tests now required. With proper type and setting of machines, proper size of electrodes and proper visual inspection of the weld after completion, satisfactory welding can be done regardless of the training of the operator.

If other investigation or testing is to be done to assure the reliability of any welded structure, the plate should be the thing examined more than the weld.

■ Output of commercial steel castings in May is reported by the bureau of the census as 41,660 net tons, compared with 34,100 tons in April and 20,636 tons in May, 1938. Five months' production this year: 189,511 tons, an increase of 58,860 tons over 130,651 tons in the corresponding period last year.

Portrays Locks' 4000-Year Span

NEW YORK

■ YALE & TOWNE MFG. CO., maker of locks, builders' hardware and materials handling equipment, has two exhibits at the World's fair. Company is participating in the Home Building center, with a display in the Home Products building. It also has furnished locks and builders' hardware in 9 of the 15 modern houses in the Town of Tomorrow. The electrified farm is completely equipped with Yale locks and hardware.

Company's main exhibit, however, is located in the Metals building, occupies more than 2000 square feet, covers two broad lines of product, locks and hardware and materials handling equipment.

Products are presented in a harmonious, dramatic and colorful manner. Many devices may be operated by visitors.

On a sunken stage electric industrial trucks and other materials handling equipment are in operation under full load. Demonstrations are explained by voice and co-ordinated with sound moving pictures showing actual operation as it would occur in industrial application.

Hand chain and electric hoists are shown in motion and make comprehensible to the public principles and details of action efficiency.

Another feature is the Yale collection of historical locks, including ancient Egyptian, Roman and medieval locks. The collection combines those of the late Austrian Emperor Francis Joseph, Baron Rothschild and Andreas Dillinger, with the modern locks originated and developed by Linus Yale Jr., a Yale & Towne founder.

Each period of lock evolution is illustrated by a mechanical movement in constant motion and surrounded by relics dating back 4000 years. They are displayed artistically around illuminated dioramas covering the ancient Egyptian, Roman, medieval and modern periods.

Co-ordinated with the historical exhibit is a talking picture portraying the evolution of locks and the part played by Yale & Towne in developing modern locking systems.

Principle of the Yale pin tumbler lock is cleverly illustrated by a giant hand actually operating a large cross section of a Yale cylinder, under control of the visitor.

Koppers To Manufacture Fast's Oil Film Bearings

■ Exclusive United States license for manufacture and sale of Fast's multiple oil film bearings has been acquired by the Koppers Co., and these will be made by the Bartlett Hayward division, Baltimore. Bearings will become a companion product to Fast's coupling which the Koppers organization has been manufacturing many years.

Bearing, like the coupling, is self-aligning and carries the load on an oil film which prevents metallic contact and wear and eliminates vibration and noise. It is claimed the bearings will run continuously for a year on a single filling of oil.

Household Appliances Show Substantial Gains

■ Domestic sales of household refrigerators by leading producers in May reached a peak for 1939, amounting to 254,805 units, compared with 242,005 for April, according to National Electrical Manufacturers' association, New York. This brings sales for the first five months to 1,065,745, substantially ahead of the 759,906 sold in corresponding period last year.

Factory shipments of washing machines in May increased 25.3 per cent over the same month in 1938, totaling 105,266 units, against 84,016, it is reported by American Washer and Ironer Manufacturers' association. Ironer shipments amounted to 8433 units, compared with 6675. For five months, washers totaled 613,984, gaining 32.45 per cent over a year ago.

Electrical vacuum cleaner sales totaling 114,377 in May were 14.9 per cent more than the 99,542 in that month last year.

Prepares Booklet on Trade Associations

■ "Sales and Profits and Trade Associations" is the title of a 10-page booklet prepared by Tuscany, Turner & Associates, trade association organization and management, 1213 West Third street, Cleveland. Designed to provide an insight to benefits to be derived through trade association activities, the publication contains discussions on sales volume, co-operative sales promotion, prices and profits, unfair trade practices, organization, industry education, the go-between business and government, and selecting the association executive. Appended are brief lists of major trade association activities, text and reference books, and Supreme Court decisions.

122 Ships Building

■ One hundred twenty-two vessels, aggregating 630,340 gross tons, were under construction July 1 to the classification of the American Bureau of Shipping, New York. This compared with 129 vessels, aggregating 631,850 gross tons, June 1, and 119 vessels, 476,560 gross tons, July 1, 1938.

Seventy-two of the 122 were seagoing vessels, aggregating 613,550 gross tons. Added to the list during June were seven vessels, having a total of 27,630 gross tons.

■ **Locks of the past 4000 years, including types used by the ancient Egyptians and the Romans, are a feature of Yale & Towne Mfg. Co.'s World's fair exhibit. Above is a display of locks of medieval type, used throughout Europe and the colonies from 1200 to 1800 A. D. Another panel shows modern locks**

Editorial

Our Tax System Needs Revamping

■ AN ENCOURAGING development is the introduction by Senator W. Warren Barbour, New Jersey, of a bill that proposes creation of a national tax commission to study overlapping taxation by federal and state governments.

The commission (STEEL, July 10, p. 34) would have five nonpartisan members, recognized authorities on taxation, specially qualified by background and experience. One member would represent the federal government, one the state governments, one business and two the public. It would be authorized to study and report to congress on "the influence of multiple taxation and reports required in connection therewith on business profits, policies and management, also the relationship between collection costs and revenue yield of taxes now in force."

In discussing the bill, Senator Barbour referred to the existing tax structure as "built on a hit-or-miss basis," as having become involved "in endless rivalry, confusion and complication." He held there should be a tacit understanding between state and federal governments as to the fields each is to occupy in raising the revenue necessary for its own purposes.

Study Should Include Character of Taxes And Methods of Their Administration

Secondary purpose of the proposed study, he explained, is to learn definitely "just how multiple taxation is affecting business, and to what extent the annoyance of innumerable reports and investigations which now harass business executives actually constitutes an impediment to the flow of goods in commerce."

Such a study would be highly desirable, but it ought to be along broader lines than now conceived. Aside from the burden of high taxes, and existing rivalry between federal, state and local agencies in seeking increased revenue, business in many instances is suffering from the character of taxes and the manner in which tax laws are administered and taxes collected. Matters connected with taxation now take up too large a share of the time of industrial and business executives. They entail extra expense in the form of clerical forces required in maintaining records and in preparing tax and information returns. There is much duplication of effort.

Taxation Situation Is Problem of First Magnitude to Business Management

Management increasingly is subject to persecution in the form of frequent audits by representatives of federal, state and local tax offices. They are forever going over the books and, in many cases, do not hesitate to impose unjustified levies sufficient at least to cover their salaries during the time they spend in such visits.

Never welcome, the tax collector today is regarded by harassed business as a sinister, hostile figure. This is because of the unprecedented rapaciousness of public officials who are impelled to go to utmost lengths to replenish treasuries that are kept empty as a result of the mounting cost of government.

This whole matter of taxes and the manner in which our system of taxation has been conceived and administered presents a problem of first magnitude to business in general. The study which would be set in motion by adoption of Senator Barbour's bill should be launched as soon as possible. Every industrial executive should write his congressional representatives to that effect.

The BUSINESS TREND

Activity Index Reflects Holiday Interruption

■ RECORDS of business for the week ended July 8 are distorted somewhat by the interruption of activity occasioned by the observance of the Fouth of July holiday. Due to this factor, together with the expected seasonal curtailment in automobile production, STEEL's index of activity declined from 91.0 to 73.4. This represents a decline of 17.6 points, while in the comparable weeks last year the index receded 9.4 points to 57.1.

Contributing to the drop in the index in the latest week were declines in all of the four business indicators from which it is composed. In the case of electric power output, revenue freight carloadings and steel works operations the major factor was the holiday interruption. The drop of 42,784 in automobile assemblies was due largely to the same cause, although a seasonal curtailment in automobile output is to be expected at this time.

Reflecting primarily the holiday interruption the national steel rate receded 12 points to 42 per cent. In the same week last year the steel rate declined 4 points to 24 per cent. Steelmaking operations rebounded to approximately the 50 to 55 per cent level in the week ended July 15, from which point it is expected to record little variation through the next 30 days.

Revenue freight carloadings declined 106,419 to 559,109 cars in the week ended July 8, from the peak this

STEEL'S INDEX OF ACTIVITY
IN IRON, STEEL AND METALWORKING INDUSTRIES
BASED UPON FREIGHT CAR LOADINGS, ELECTRIC POWER OUTPUT, AUTOMOBILE ASSEMBLIES (WARD'S REPORTS) AND STEELWORKS OPERATING RATE (STEEL). AVERAGE FOR 1926 EQUALS 100 WEIGHTED AS FOLLOWS: STEEL RATE 40, AND CARLOADINGS, POWER OUTPUT AND AUTO ASSEMBLIES EACH 20.
NO ADJUSTMENTS MADE FOR SEASONAL OR OTHER TRENDS.
PER CENT
1929 1930 1931 1932 1933 1934 1935 1936 1937 1938 1939
1938
1939

STEEL'S index of activity declined 17.6 points to 73.4 in the week ended July 8.

Week ending	1939	1938
April 22	90.4	70.8
April 29	89.2	68.4
May 6	85.1	68.5
May 13	84.2	67.2
May 20	86.6	67.1
May 27	85.4	66.5
June 3	75.9	58.1
June 10	88.2	64.4
June 17	90.9	65.2
June 24	93.0	66.0
July 1	91.0†	66.5
July 8	73.4	57.1

† Revised.

Mo. Data	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929
Jan.	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1	87.6	104.1
Feb.	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5	99.2	111.2
March	92.6	71.2	114.4	88.7	83.1	78.9	44.5	54.2	80.4	98.6	114.0
April	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0	101.7	122.5
May	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6	101.2	122.9
June	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1	95.8	120.3
July	....	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3	79.9	115.2
Aug.	....	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4	85.4	116.9
Sept.	....	72.5	96.8	86.7	69.7	56.9	68.0	46.5	64.3	83.7	110.8
Oct.	....	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2	78.8	107.1
Nov.	....	95.9	84.1	106.4	88.1	54.9	52.8	47.5	54.4	71.0	92.2
Dec.	....	95.1	74.7	107.6	88.2	58.9	54.0	46.2	51.3	64.3	78.3

year of 665,528 cars recorded in the preceding week. In the comparable week last year freight traffic was 501,013. Electric power consumption also receded to lower levels during the holiday week to 2,077,956,000 kilowatt-hours.

With but few exceptions industrial activity is expected to level out during July at approximately the June level. The anticipated slight gains among some important industrial groups will probaby be partially offset by seasonal declines in others, such as the automotive industry.

AVERAGE DAILY INGOT OUTPUT INCREASES

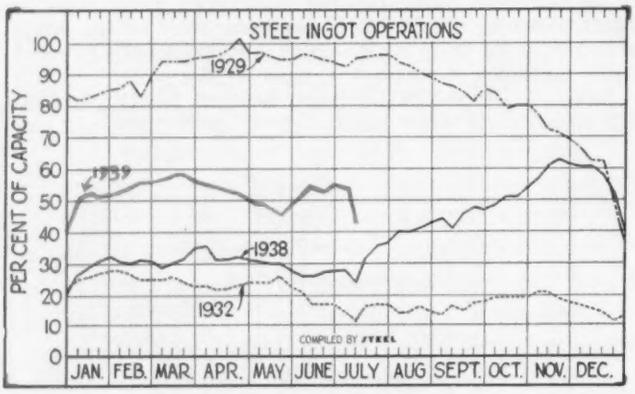
The daily average ingot production during June was 120,399 gross tons, based on total output of 3,130,381 gross tons reported by the American Iron and Steel institute. This compares with a daily average of 108,069 in May and 63,010 tons in June, 1938. Total production in the first six months this year aggregated 18,629,927 tons, a gain of 73 per cent over the 10,788,683 tons produced in the corresponding 1938 period. The industry operated at an average of 53.44 per cent of capacity during June, against 48.24 per cent in May and 28.36 per cent in June, 1938. Ingot operations for the first half averaged 52.74 per cent, compared with 31.08 per cent in the corresponding 1938 period.

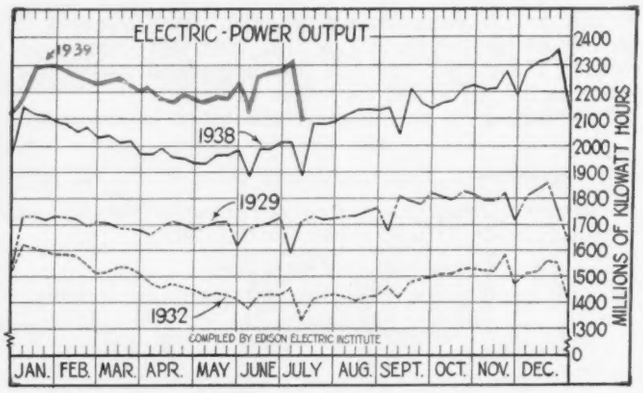
RAILWAY OPERATING INCOME IMPROVES

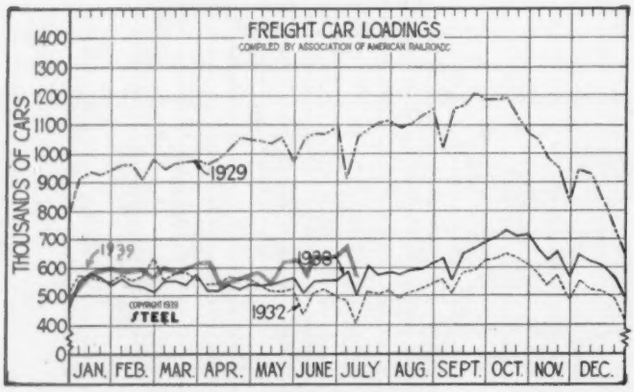
Net operating income of the country's class I railroads rose to $25,100,765 in May from $15,257,935 in April, according to the Association of American railroads. In May last year the net operating income was $16,665,684. Rate of return on property investment in May was 1.32 per cent, compared with 0.87 per cent in the same month last year. For the first five months this year net operating income totaled $126,167,043, or a return of 1.50 per cent on invested property. This compares with $46,025,993, equal to 0.55 per cent return on property invested in the corresponding 1938 period.

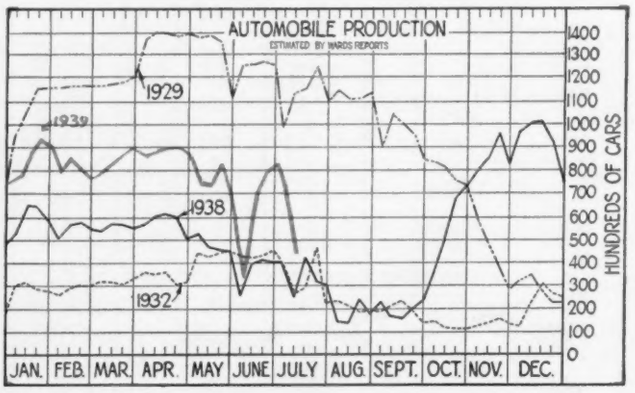
JUNE CAR AWARDS DECLINE

Domestic freight car awards during June totaled 1324 cars, down moderately from the 2051 cars ordered during May but compares favorably with the June, 1938, total of 1178. In the first six months this year car awards aggregated 9532, against 8021 in the corresponding period of 1938, 45,985 in the same period of 1937 and 28,109 in the first half of 1936.

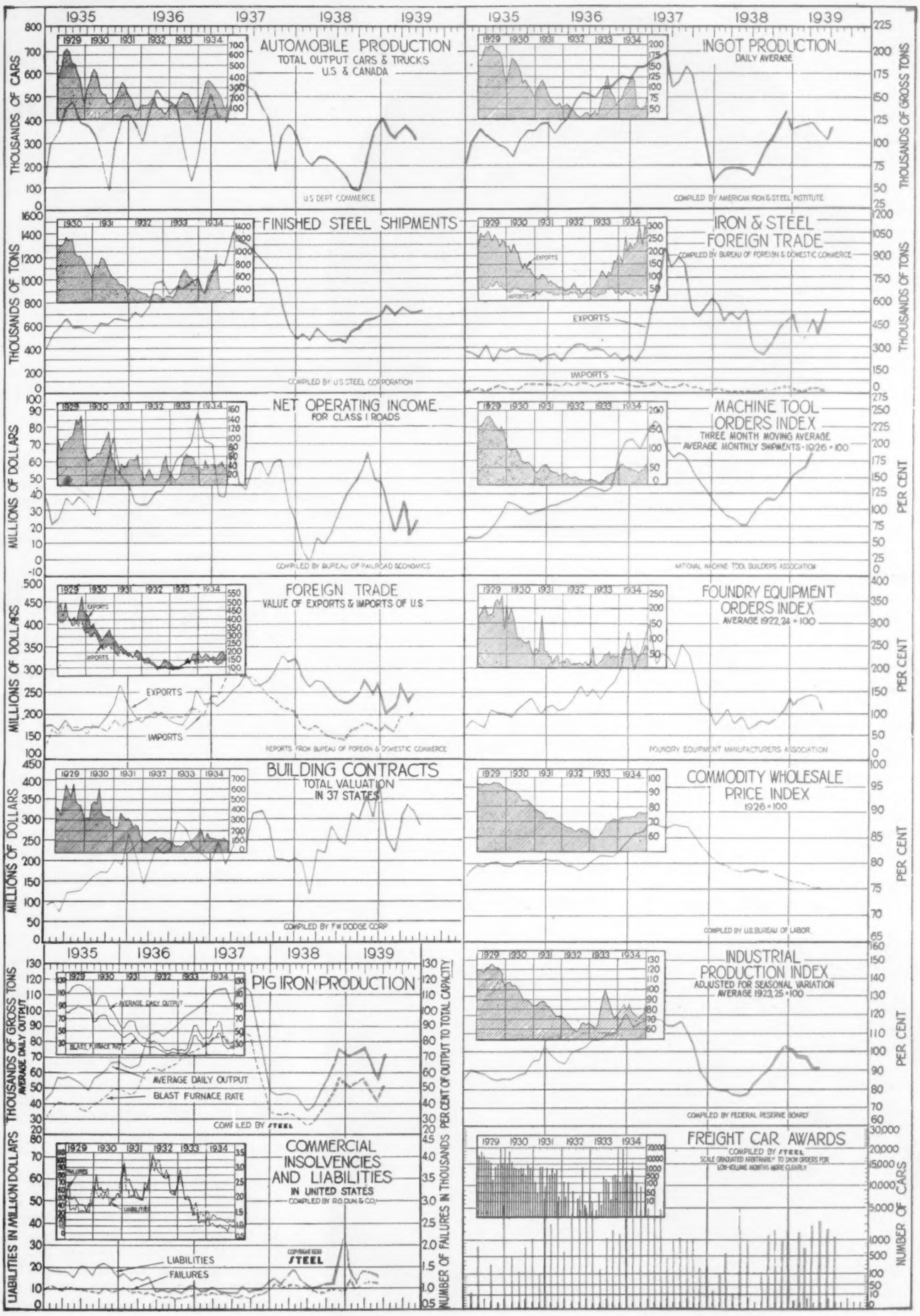




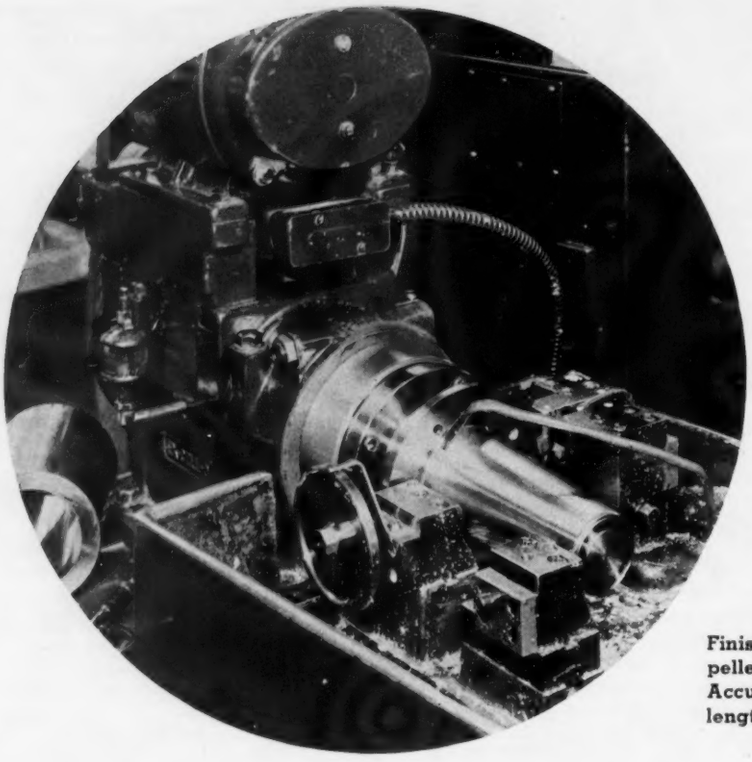




Week ending	Steelworks Operating Rate Per Cent 1939	1938	1932	1929	Electric Power Output Million KWH 1939	1938	1932	1929	Freight Car Loadings Thousands of Cars 1939	1938	1932	1929	Weekly Auto Output 1939	1938	1932	1929
Apr. 1	54.5	36.0	23.0	95.0	1,210	1,979	1,480	1,680	604	523	545	967	85,980	57,500	35,756	120,000
Apr. 8	53.5	32.0	22.0	95.5	2,173	1,990	1,465	1,663	535	522	545	956	87,019	60,975	35,390	138,417
Apr. 15	51.5	32.0	22.0	96.0	2,171	1,958	1,480	1,697	548	538	567	972	88,050	62,021	35,778	140,822
Apr. 22	50.5	32.5	23.0	98.0	2,199	1,951	1,469	1,709	559	524	562	1,004	90,280	60.563	30,672	140,290
Apr. 29	49.0	32.0	24.0	101.0	2,183	1,939	1,445	1.700	586	543	554	1,052	86,640	50,755	31,121	139,732
May 6	49.0	31.0	24.0	97.0	2,164	1,939	1,429	1,688	573	536	534	1,050	71,420	53,385	43.899	140,672
May 13	47.0	30.0	24.0	97.0	2,171	1,968	1,436	1,698	555	542	517	1.048	72.375	47,415	42,587	138,541
May 20	45.5	30.0	25.5	96.0	2,170	1,968	1,435	1,704	616	546	516	1,046	80,145	46,810	43,470	139,528
May 27	48.0	28.5	23.0	95.0	2,205	1,973	1,425	1,705	628	562	521	1,061	67,740	45,120	45,121	136,032
June 3	52.0	25.5	21.0	95.0	2,114	1,879	1,381	1,615	568	503	447	972	32,445	26,980	44,116	111,372
June 10	53.5	25.5	17.0	96.5	2,257	1,992	1,435	1,690	635	554	502	1,055	65,265	40,175	43,491	125,307
June 17	52.5	27.0	17.0	96.0	2,265	1,991	1,441	1,699	638	556	518	1,069	78,305	41,790	44,121	126,125
June 24	54.5	28.0	17.0	94.0	2,285	2 019	1,440	1,723	643	559	499	1,096	81,070	40,918	45,110	125,736
July 1	54.0	28.0	14.5	93.0	2,300	2,015	1,456	1,592	666	559	480	909	70,663	40.945	40,291	98.746
July 8	42.0	24.0	12.0	95.0	2,078	1,881	1,341	1,712	559	501	416	1,065	42,784	25,375	25,560	113,586


1935 1936 1937 1938 1939
AUTOMOBILE PRODUCTION
TOTAL OUTPUT CARS & TRUCKS U.S. & CANADA
THOUSANDS OF CARS
U.S. DEPT. COMMERCE
INGOT PRODUCTION
DAILY AVERAGE
THOUSANDS OF GROSS TONS
COMPILED BY AMERICAN IRON & STEEL INSTITUTE
FINISHED STEEL SHIPMENTS
THOUSANDS OF TONS
COMPILED BY U.S. STEEL CORPORATION
IRON & STEEL FOREIGN TRADE
COMPILED BY BUREAU OF FOREIGN & DOMESTIC COMMERCE
EXPORTS
IMPORTS
NET OPERATING INCOME
FOR CLASS I ROADS
MILLIONS OF DOLLARS
COMPILED BY BUREAU OF RAILROAD ECONOMICS
MACHINE TOOL ORDERS INDEX
THREE MONTH MOVING AVERAGE
AVERAGE MONTHLY SHIPMENTS - 1926 = 100
PER CENT
NATIONAL MACHINE TOOL BUILDERS ASSOCIATION
FOREIGN TRADE
VALUE OF EXPORTS & IMPORTS OF U.S.
REPORTS FROM BUREAU OF FOREIGN & DOMESTIC COMMERCE
FOUNDRY EQUIPMENT ORDERS INDEX
AVERAGE 1922-24 = 100
FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION
BUILDING CONTRACTS
TOTAL VALUATION IN 37 STATES
COMPILED BY F.W. DODGE CORP.
COMMODITY WHOLESALE PRICE INDEX
1926 = 100
COMPILED BY U.S. BUREAU OF LABOR
PIG IRON PRODUCTION
AVERAGE DAILY OUTPUT
BLAST FURNACE RATE
THOUSANDS OF GROSS TONS
PER CENT OF OUTPUT TO TOTAL CAPACITY
COMPILED BY STEEL
INDUSTRIAL PRODUCTION INDEX
ADJUSTED FOR SEASONAL VARIATION
AVERAGE 1923-25 = 100
COMPILED BY FEDERAL RESERVE BOARD
COMMERCIAL INSOLVENCIES AND LIABILITIES
IN UNITED STATES
COMPILED BY R.G. DUN & CO.
LIABILITIES IN MILLION DOLLARS
NUMBER OF FAILURES IN THOUSANDS
LIABILITIES
FAILURES
COPYRIGHT 1939 STEEL
FREIGHT CAR AWARDS
COMPILED BY STEEL
SCALE GRADUATED ARBITRARILY TO SHOW ORDERS FOR LOW-VOLUME MONTHS MORE CLEARLY
NUMBER OF CARS

Improved



Finish turning and facing Ampco bronze propeller cone, on Ex-Cell-O precision machine. Accuracy is held within .00025 inch on taper length of 6 inches, with surface entirely free from tool marks

■ SINCE announcement of the forthcoming National Machine Tool show, I have been asked this pointed question by a large user of machine tools: "Can you name one outstanding development in the machine tool field since 1935 which will justify me in again spending hundreds of dollars to send my key men to Cleveland in October?"

To this I have been able to make this equally forthright reply: "I can. The answer is *tooling.*"

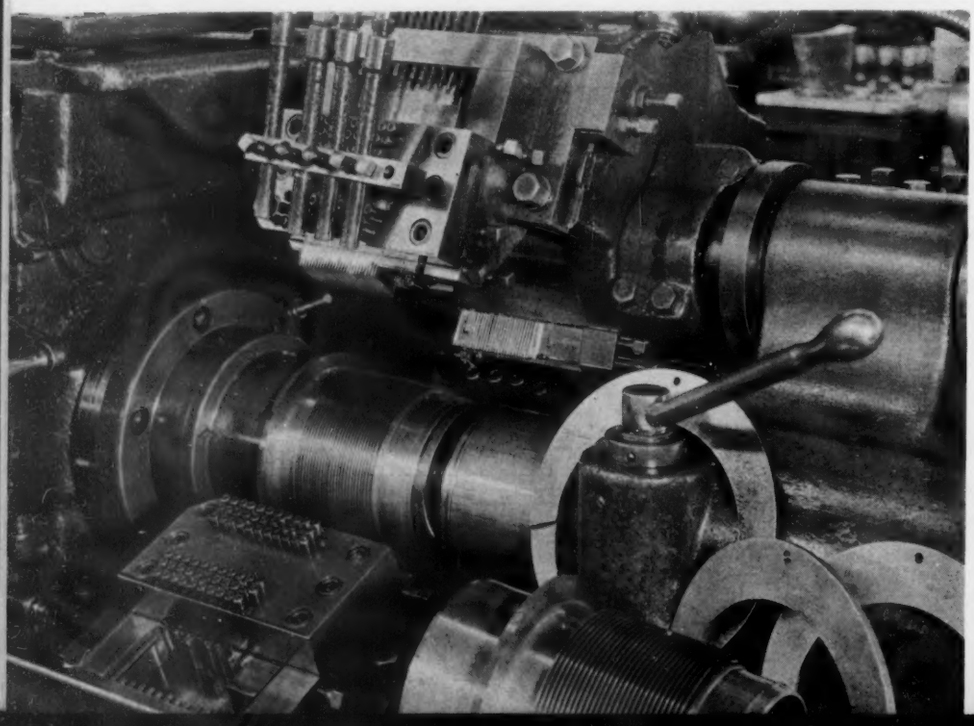
In an estimate of the significance of the National Machine Tool shows, in the July 3 issue of STEEL, I made this statement: "As a matter of fact, tooling developments alone since 1935 would well justify this 1939 show regardless of any improvements in machine tools."

There is no intention here to imply that improvements in machines have not been equally significant and logical. They certainly have been, and the show will bear that out. What I am driving at is that no executive in the metalworking industry can afford to have his men miss the 1939 show just because he does not contemplate machinery purchases at that time. What his men will bring back in the way of up-to-the-minute tooling information will be of tremendous dollars-and-cents importance to him in connection with his present equipment.

Should anyone ask me for tangible evidence supporting my convictions regarding recent improvements in tooling, I can produce plenty of it. For instance, I have before me as I write this, advance copies of new tool catalogs by two of the largest manufacturers of standard production machine tools. In each case these catalogs— which are large, expensive books and unsually informative—cover completely redesigned and greatly broadened lines of standardized tools and attachments, representing intensive work of many engineers and tooling experts over the past two or three years.

Unrealized Capabilities Revealed

These new tools not only will insure satisfactory performance with cemented carbide tools, but they also will give surprising results with the older cutting materials. They not only will insure peak performance of the latest model machines, but they also will bring out previously unrealized capabilities when used in connection with older model machines which are in good mechanical condition. In addition to all this they will enable difficult setups to



Cooling fins on Pratt & Whitney aircraft engine cylinder barrels are formed in solid forgings by this Fay automatic setup. Front bank of tools cut straight grooves, while top and rear banks taper sides of the fins, which are 5/8-inch deep and only .020 inch thick at outer edges

By GUY HUBBARD
Machine Tool Editor

Tooling Boosts Machine Tool Efficiency

be made quickly and economically—setups for which production men in many cases have lately been insisting upon costly special tools and even special machines.

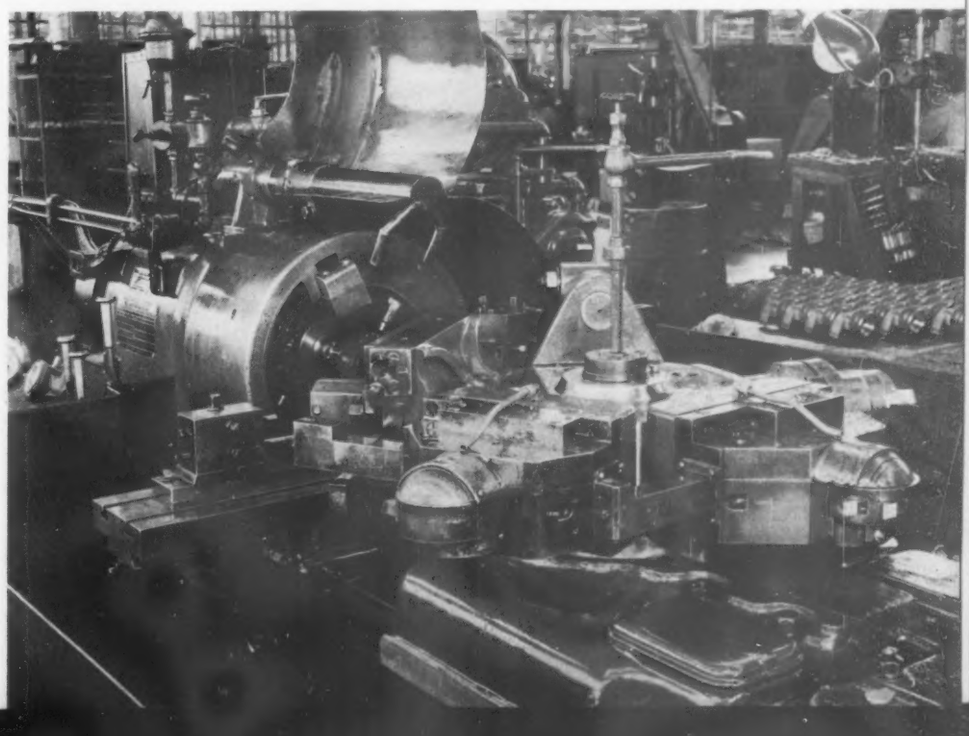
Every machine tool builder is familiar with altogether too many cases of customers who profess disappointment in the performance of new machine tools but who fail to put the blame where it belongs—on inferior tooling for which these customers themselves are directly responsible. These situations closely parallel that of a marksman who blames a high grade firearm for unsatisfactory performance due to inferior ammunition, or the photographer who expects perfect results from an expensive camera loaded with cheap film.

Cheap Tooling Is Often Costly

Poor tooling by machine tool users has been due primarily to two factors. First, their mistaken ideas as to the economy of "home-made tools." Second, their lack of appreciation of the broad capabilities of the highly developed systems of standardized tooling such as are available now at reasonable cost from progressive machine tool builders. The first has been due largely to machine tool users' faulty figuring of relative costs (and efficiency) of "home-made" and "professional" tooling. In the second case however the fault lies more with machine tool builders who have failed to put the necessary amount of vigor into the selling of their improved lines of tooling.

In the machine tool industry there never were, are not now and probably never will be, periodic model changes. Therefore the fact that there is to be another show this fall after a period of four years is not to be interpreted by those who purchased machines following the 1935 show that every machine purchased at that time will be outmoded by what will be exhibited at the 1939 show. If design changes in the meantime have been justified, they will be found to have been made, but they will not be simply for the sake of getting something new into the 1939 show.

In other words, no 1935 customer who visits the 1939 show is going to have reason to feel that the machine tool industry has left him "holding the bag." In many instances he will find machine tools which basically are identical to those which he purchased in 1935, even though they are sure to be cleverly retooled to meet 1939 conditions. On the other hand, if changes in the design of the machines in the meantime have taken place, the customer will find that through application of the 1939 tooling, the performance of his 1935 machines, if still in good condition, can be so greatly improved that there will not be the slightest excuse for scrapping them prematurely. In such cases the visitor will find, moreover, that exhibitors at the show will be just as anxious to bring him up to date on his tooling as they will be to sell him a new machine. That is good business because it will serve to clinch the new machine order when the proper time for it arrives.



Here is an ingenious and noteworthy turret setup on a Potter & Johnston automatic chucking machine. Some of these tools machine the flanges of Pratt & Whitney cylinder heads in conventional way. Others, moving independently of the turret, accurately form internal spherical surfaces within the domes

Check and Double Check for QUALITY CONTROL

Adequate instrumentation and special facilities at new mill afford means of checking closely all steps in rolling process from slab to finished product. Many interesting practices at this modern mill are detailed here

■ MAINTAINING quality standards at the new Irvin works of Carnegie-Illinois Steel Corp. near Pittsburgh involves an elaborate system of inspection as well as use of several new and unusual instrumentation and control setups in addition to usual control systems.

Checking begins at the slab storage yard where every slab is instantly identifiable as to analysis, heat and ingot position. Slabs are piled to permit the heating furnaces to be charged in proper sequence.

At the heating furnaces complete furnace control equipment assures close co-ordination between rolling and heating operations. A recording pyrometer shows temperature being maintained in soaking zone of the furnaces, ordinarily held within plus or minus 10 degrees Fahr.

Special equipment enables operating and metallurgical departments to study the relation between the speeds, temperature, pressure and other factors in rolling. Each mill stand has a built-in strain gage, indicating in thousands of pounds the pressure at the stand. These are connected with recording units so records may be kept for study as required.

Temperature is closely watched throughout. An indicating pyrometer at the spreading mill informs the operator of slab temperature at this point. Another indicating pyrometer, reading at the floor station and in the pulpit, is installed immediately ahead of the finishing train to check temperature of the steel before entering this unit. Steel is not allowed to enter the finishing train until is cools to the proper temperature. The operator therefore adjusts speed of tables so that proper temperature is obtained by the time he permits the steel to move on through the 80-inch finishing train.

There is a pyrometer installed between the last two stands of the finishing train indicates temperature of strip as it leaves the train. This usually is held within plus or minus 10 degrees Fahr. A second pyrometer just ahead of coilers registers temperature here which is held withing plus or minus 25 degrees Fahr. Coiling temperature range varies between 1000 and 1350 degrees Fahr. according to type of steel being rolled and temper required.

Bearings Watched

Telephonic communication is maintained with operator at roughing train and at furnaces to correlate temperatures, slab timing and speeds.

Metallurgical and operating departments closely watch a number of interrelated quality control factors at the finishing train. For instance, the crown and finish of the rolls bear a close relation to uniformity of gage and finish of the final product and they must be varied according to subsequent processing and finishing. Roll neck bearings are watched closely, for their condition plays an important part in the uniformity as well as accuracy of gage of the strip.

Three batteries of spray nozzles aid in controlling temperature of

Instruments in rougher control pulpit at 80-inch hot strip mill, Irvin Works

strip as it comes from the mill. The first battery consists of 9 nozzles above the strip and 16 below, second have 8 and 8, while the third has 8 nozzles on top only. Regulation of these nozzles provides the desired temperature control without interfering with operating speeds which vary between 1000 and 2000 feet per minute.

Since ductility of hot rolled sheets is an important quality factor, provision is made for self-annealing of the cut sheets as they are piled. Neat piles aid in maintaining uniform quality. Also the high speed of the mill and runout tables help.

Inspectors are on duty at the three cold mills at all times, constantly checking finish and gage of the strip as it leaves the mills and checking contour of strip.

Complete instrumentation in the cold reduction department allows the mill operators to balance and control screwdowns and roll pressures on all stands, roll speeds and the tension at entering and discharge ends of the mills as well as between stands. Flying micrometers indicate gage of product leaving the mills.

Pyrometers Checked Regularly

To be certain that the pyrometers used in the annealing department to control annealing temperatures are maintained at maximum accuracy, they are checked at least every other day and are regularly gone over by an inspector to assure consistent uniform accuracy. Lead wires of annealing furnace thermocouples are checked by research department before going into service and all pyrometers are compared with a standard at least once every two weeks.

To check on efficiency of annealing operations, hardness tests are run on the coils. Also ductility and structure are tested periodically. In addition, stiffness of finished tin plate which is an extremely important item, is determined for every coil.

Ductility is checked by Olsen and tensile tests. The tin temper mills present a major problem since they must meet metallurgical requirements varying ordinarily from 40 to 75 on the Rockwell 30T scale, with occasional values up to 80.

At shearing lines, flying micrometers operate through delay relays to sort the plate automatically by gage, holding the pack within allowable tolerance. The shear lines operate at strip speeds up to 350 feet per minute. Even after passing the mechanical assorters, shear plates receive an additional examination for gage, surface and squareness.

This testing machine checks temper of tin plate in control laboratory

Ten plates are taken at random from each temper rolling for a final check on accuracy of preceding tests and to provide a cross-sectional check on the condition of the plate as shipped. These plates are subjected to a Rockwell hardness test, Olsen test for ductility and the Schoppers test for stiffness. Also a tensile strength test is given at intervals. Accuracy of base weight is checked as a matter of routine and fluting tests are run on certain classes of finished product.

To maintain close control up to the very last, normal practice at Irvin Works is to require that all temper rolling be done just prior to shipment. Accelerated aging tests, however, are made at the cold strip laboratory to determine the effect of a possible three months storage at the customer's plant. Duplicate specimens are kept for rechecking.

Routine practice calls for applying hardness and ductility tests to practically all sheet or strip after temper rolling. Much of the product is subjected to a bulge test to show how surface will appear after drawing. This test can be applied to any type of sheet and is particularly helpful in determining the proper roll finish. It has played an important part in rapid development and progress of deep drawing.

These tests are supplemented by pull tests made on longitudinal samples to show up any light coil breaks if they occur. Strain tests also are made on notched samples in a specially designed machine to indicate whether or not the sheet has been temper rolled sufficiently to avoid the occurrence of stretcher strains in subsequent forming operations.

In certain cases every sheet in a pack is checked for gage immediately after temper rolling.

Laboratory for Porcelain Enamel

Four laboratories in the mill and the main plant laboratory provide adequate metallurgical and chemical facilities. A special enameling laboratory is provided for investigating the effect of sheet surface on adherence of porcelain enamel. Complete facilities for pickling, together with an enameling pot and furnace are included, with special enamel adherence testing machines.

Experience indicates that frequently a minor change in processing, either in the steel mill or in the customer's plant, often solves an apparently major problem. Quality control thus is extended to serve not only the steel producer and the product manufacturer, but also the ultimate consumer.

Assorting black plate for gage in black plate warehouse of Irvin Works

Conveyorized

High production porcelain enameling tends toward complete mechanization of handling operations. Modernized plant described here is typical example of mechanized handling in this industry. It features continuous chain type conveyors

■ RECENT modernization at porcelain enameling plant of Kalamazoo Stove & Furnace Co., Kalamazoo, Mich., is calculated to make this plant one of the most modern in the country from the standpoint of mechanical enameling practice. Here handling has been mechanized almost completely.

In 1936, two box-type enameling furnaces were installed as original equipment. Some time later five more were added. Recently four of the old box-type enameling furnaces were removed and a Ferro 7-burner oil-fired continuous furnace installed. In addition, a new ground coat machine, new spraying equipment, a storage conveyor for brushed ware and a new conveyor for finished ware have been installed and placed in operation. These improvements make a most perfectly co-ordinated and smooth-running enameling plant.

There appears to be a definite swing toward the continuous type of operation in porcelain enameling plants, especially where a large volume of production is involved. Enameling operations lend themselves readily to continuous handling systems for a number of reasons.

In the first place, each item to be porcelain enameled, no matter what its size or shape, receives the same treatment or processing as it goes through the plant. These operations may be divided according to the following brief outline. After fabrication by means of stamping or forming to the desired shape, piercing of holes, forming of design, etc., the raw steel is pickled and cleaned to remove all oil, grease, dirt and dust from the surfaces and to prepare the steel surface to receive the enamel undercoat.

Subsequent operations consist of dipping or spraying on the under coat, drying in an oven, followed by fusing at a higher temperature; application of the first finish coat, followed by drying and fusion; and ending up with application of the second finish coat, drying and fusing it.

Chain Conveyor Adds Flexibility

Most flexible kind of conveyor for this work appears to be the chain type where normal working height above floor provides ample clearance for the largest parts and affords maximum accessibility. By using different types of racks, hooks or tools on the chain, it is easy to accommodate a wide range in size and shape of articles handled. Also, a chain type conveyor, being suspended from overhead, takes up no floor space and leaves maximum room for working operations such as spraying as shown in Fig. 3.

Referring to the layout diagram, Fig. 2, it will be noted that in addition to the main furnace conveyor chain, there also are a number of other conveyor chains. Use of these various conveyors will be pointed out when following flow of material through the plant.

While many parts of Kalamazoo stoves are of cast iron, more and

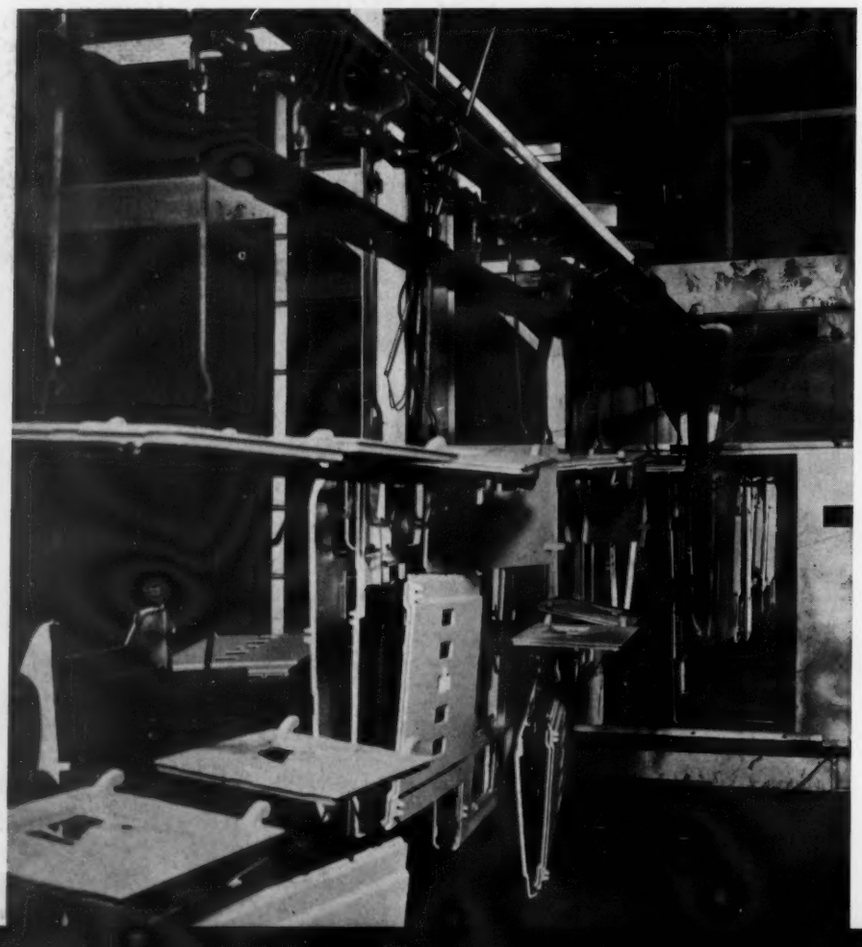
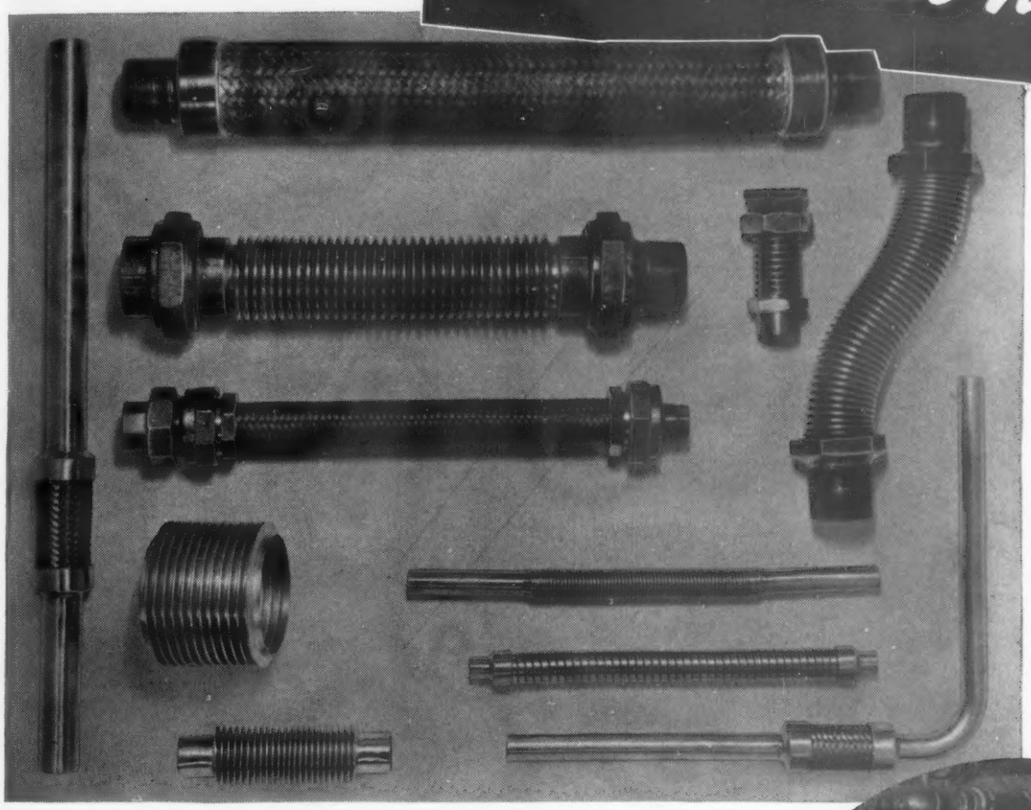


Fig. 1—Chain type conveyors permit maximum accessibility, take up little space, easily handle any type, size or shape of work. Illustrations courtesy Ferro Enamel Corp., Cleveland

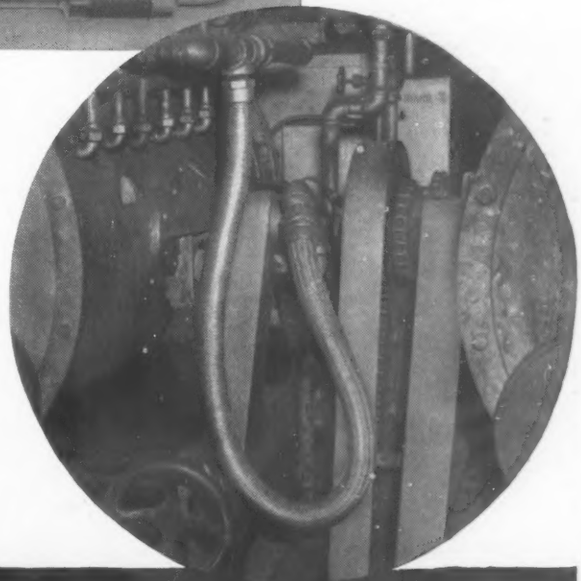
It's the toughest Tubing you can buy

American Seamless Flexible Metal Tubing



LEFT: *A few examples of special flexible tubing assemblies with fittings that we have designed for specific engineering requirements.*

BELOW: *Here's a 6-ft. length of 2" I. D. American Seamless Flexible Bronze Tubing conveying manufactured gas to a heat treating furnace.*



Because it's all metal, *it combines strength and flexibility with safety and long life in service*

American *Seamless* Flexible Metal Tubing is successfully used today in thousands of industrial plants for connecting misaligned or moving parts... for absorbing vibration... for the dependable conveyance under pressure of air, steam, oil, water and gases. American *Seamless* is *all metal*—with no joints, welds, laps, seams, or packing of any kind. It's the toughest tubing you can buy. Available in several metals for various working conditions.

Write us about your connector problems. Our engineering department has complete information on the use of American *Seamless* on all types of equipment. And ask for free reference handbook, *Catalog SS-25.*

39248

American Metal Hose

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In Canada: Anaconda American Brass Ltd., New Toronto, Ont.

more are being made from sheet steel. Arrangement of equipment and conveyors is such as to permit complete changeover to the processing of steel in a few moments. Under present schedules, the large continuous enameling furnace operates daily on cast iron pieces for 16 hours with furnace temperature maintained between 1300 and 1320 degrees Fahr. Remaining 8 hours of the day are used in fusing porcelain enamel on steel, about 5 hours of this period being devoted to producing a ground coat at 1560 degrees Fahr. and the other three hours being employed in finishing the steel cover coat at a temperature range between 1520 and 1530 degrees Fahr. Furnace temperature is easily and quickly changed from one value to another for these operations and automatic control operates burner valves to maintain accurately the temperature desired.

Sheet steel pieces ready to be porcelain enameled first go to the pickle room where a conveyor helps in handling material through the various pickle and rinse baths. This conveyor is a closed type, parts being placed on at one end, passed through the pickle baths and removed as they come back to the drying station. After being pickled and dried in the pickle room shown at lower left, Fig. 2, steel parts are taken to the ground coat line seen at the extreme left, Fig. 2. Here parts, after being dipped into the ground coat tank, are hung on the chain conveyor which travels a short distance over a drainboard before entering the drying oven.

Conveyor chain here is approximately 237 feet long, about half of which is within the drying oven where the conveyor carries the material three lengths, following a figure S. This drier unit is operated with indirect oil-fired air heaters and is maintained at a temperature of about 350 degrees Fahr. Average speed of conveyor chain here is 25 feet per minute.

Conveyor Goes To Booths

After drying on this line, the ware is given either a stipple finish or black edge finish as may be required. Conveyor, after emerging from the drying oven, first passes through the black-edging and reinforcing spray booths. Chain then travels to the stippling booths and on to a point where main furnace chain parallels the ground coat chain, permitting transfer.

Banks of material are maintained at various points throughout the plant, a bank for pickled ware being in the area adjoining the dip tank, the starting point for the ground coat conveyor. Another bank is maintained just before this conveyor chain reaches the transfer point so material can be removed from the chain and placed directly on the continuous furnace chain or placed in storage at this point. While large banks of material are avoided, it is advantageous to maintain a certain volume of material in bank at various transfer points so feeding of a conveyor will not be interrupted if some equipment is shut down temporarily.

Sheet steel parts transferred to main furnace chain pass directly into the U-type continuous furnace where the ground coat is fused to the metal. After going through a cooler at point where chain leaves the furnace, the conveyor travels along one side of the furnace past an unloading station where parts are removed from the chain, carefully inspected and either placed in a bank or put on trucks and carried to the cover-coat spray booths shown at upper right in Fig. 2.

Here are two cover-coat spray booths and drying ovens, each forming a continuous line with treadmill conveyors carrying the work through. Drives for these convey-

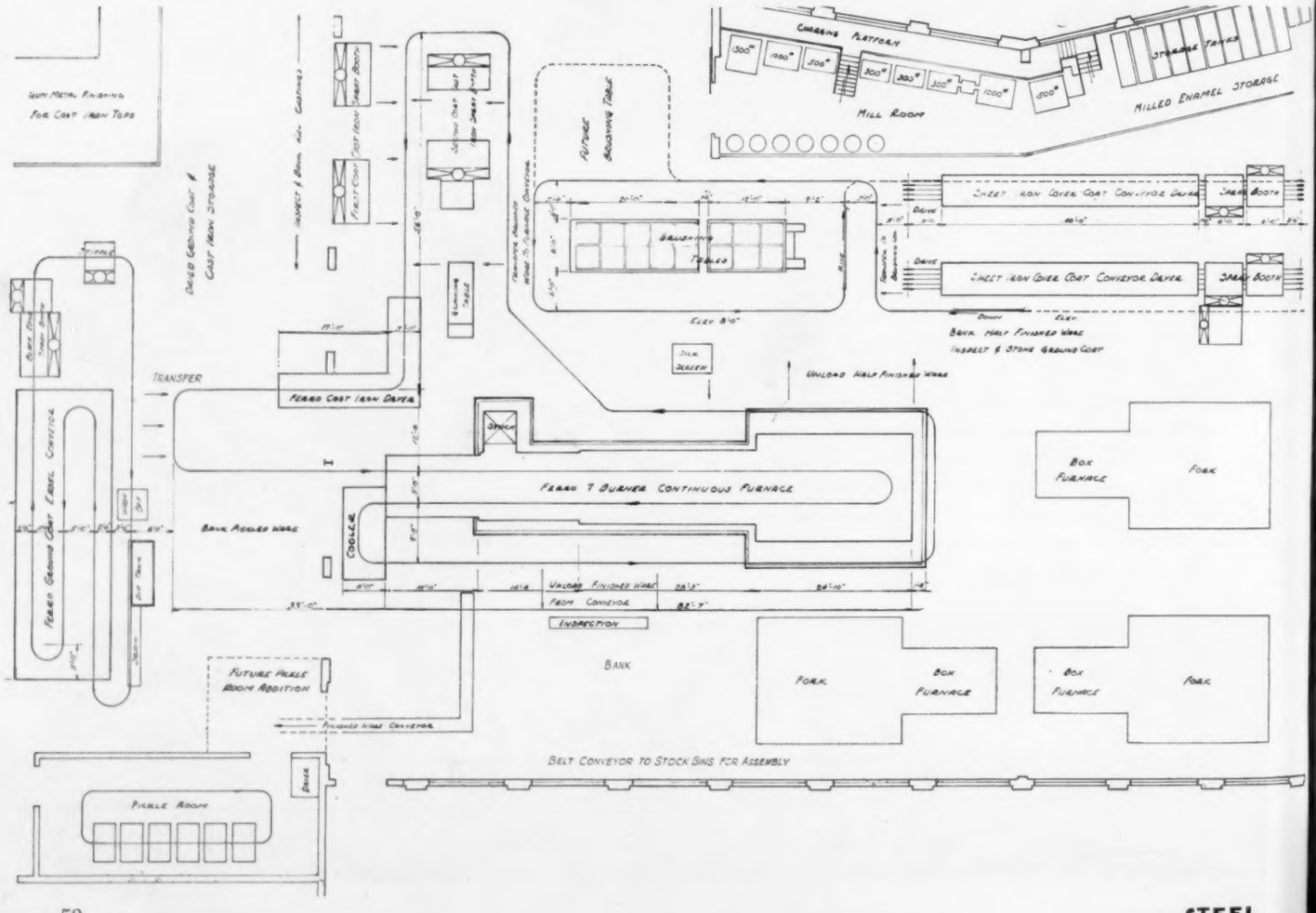
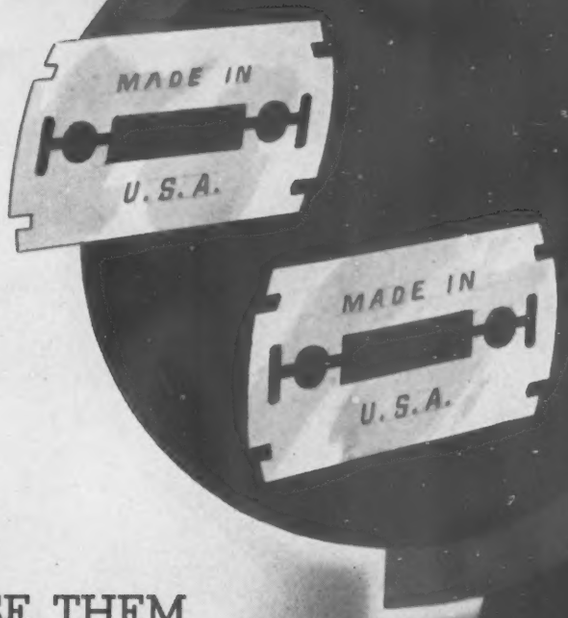


Fig. 2—Layout diagram of equipment and conveyor lines at plant of Kalamazoo Stove & Furnace Co., Kalamazoo, Mich.

They Look alike



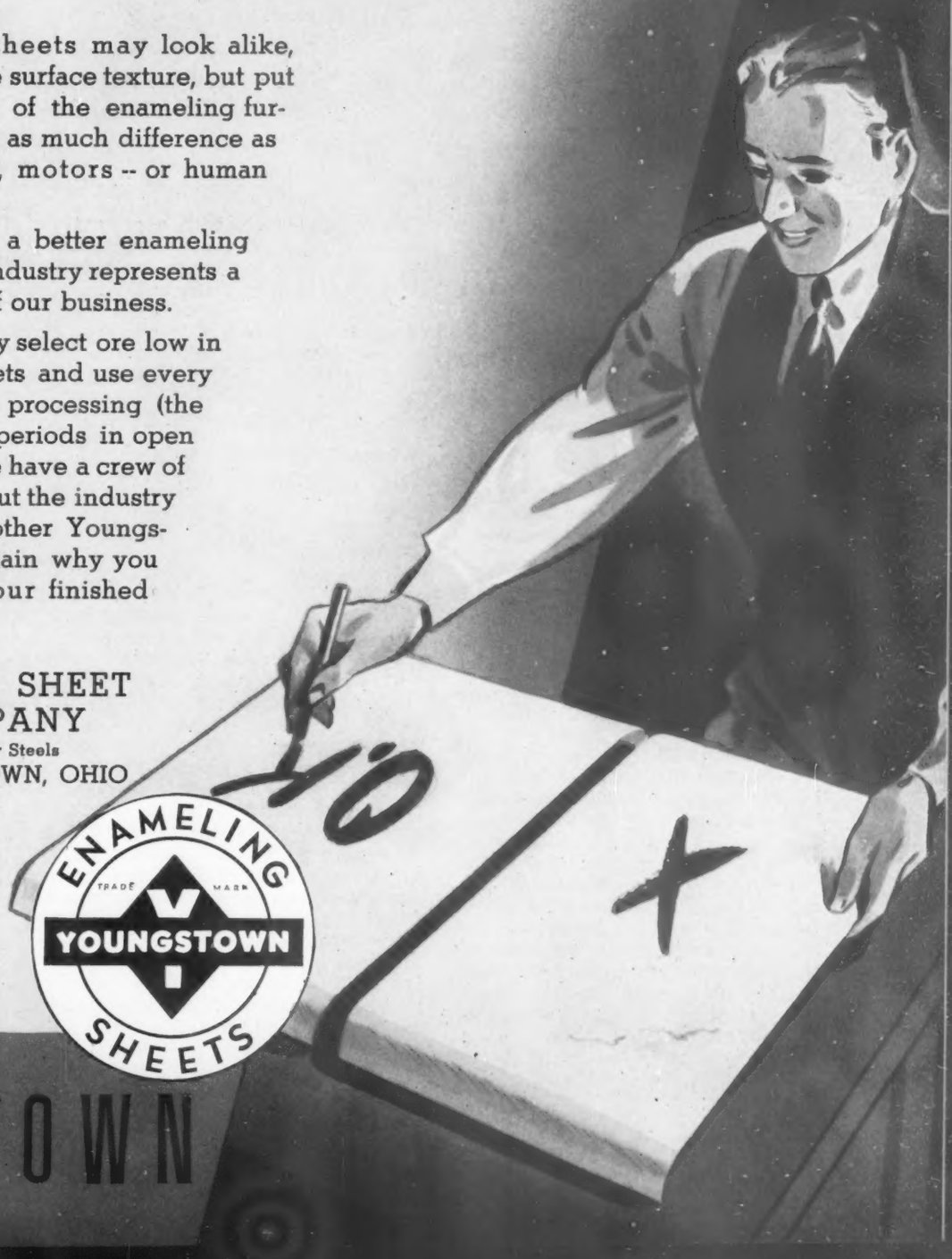
BUT THE DIFFERENCE

SHOWS UP WHEN YOU USE THEM

ENAMELING sheets may look alike, have the same surface texture, but put them to the test of the enameling furnace and there is as much difference as there is in razors, motors -- or human beings.

Youngstown makes a better enameling sheet because your industry represents a very important part of our business.

That's why we carefully select ore low in impurities for the sheets and use every possible control in the processing (the ore is refined for long periods in open hearth furnaces) -- why we have a crew of inspectors noted throughout the industry as "cranks". These and other Youngstown special practices explain why you get a high uniformity in your finished products.



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ENAMELING TRADE MARK YOUNGSTOWN SHEETS

6-6B

YOUNGSTOWN

Fig. 3—This shows flexibility of chain conveyor for enameling service as parts are sprayed with enamel coat as they pass through this booth without removing them from the chain, thus facilitating production

ors are at exit end of the line as shown in Fig. 2.

From this point, material is transferred to a chain conveyor which makes a circuit of the brushing tables. This conveyor also acts as storage as a large bank of parts is maintained on it. The chain suspends racks each of which forms a group of shelves or decks on which parts are placed at the transfer point. As the parts travel on a circuit around the bushing tables, they are removed from the conveyor and the edges and bolt-holes brushed. Parts then are placed back on the conveyor.

As it is expected there soon will be a much larger proportion of sheet steel parts, provision is made for future brushing tables and enlargement of the brush chain conveyor as shown by dotted line on Fig. 2.

That portion of the brush conveyor paralleling a section of the main furnace chain provides a transfer point where the brushed parts are hung on the chain and sent to the continuous furnace. After fusing the first cover coating, most sheet steel parts are removed, inspected and given a second cover coat by repeating the cycle of operations just described, starting at cover-coat spray booths in upper right, Fig. 2.

Sheet steel parts with a ground coat and two cover coats are placed on a belt conveyor along the side of the building near the unloading point on the main chain. This conveyor, indicated in Fig. 2, was just recently installed. It takes the material to stock bins on the second floor, from which point the finished parts are taken to assembly.

Pieces Dried on Furnace Chain

One of the most interesting features in connection with the handling system at this shop is that provision has been made for drying cast iron pieces while they hang on the furnace chain itself, thus eliminating extra handling of large, heavy pieces and saving floor space and time. See Fig. 2.

Cast iron parts, after being sandblasted to thoroughly clean them and prepare them to receive the porcelain enamel coating, are placed in a storage area, upper left, Fig. 2. Upon being inspected, castings receive the first coat in one of two spray booths at left of main furnace chain at this point. The sprayed pieces are hung directly on the chain carrying them into the drier where the chain makes a right-angle turn. This drier is 34 feet long and is indirectly fired with oil heat. Main conveyor then takes material through the continuous furnace to fuse the coating.

Parts are not removed from the

(*Please turn to Page* 81)

New Meehanite Metals

■ As a result of co-operative research by members of the Meehanite Research Institute of America Inc., 311 Ross street, Pittsburgh, two new types of Meehanite metal have been developed which are to be known as: Super A Meehanite and Super WH Meehanite. Production of these two types of metal is covered by new patents issued to the Meehanite Metal Corp., Pittsburgh.

Super A Meehanite is an alloyed Meehanite, using copper largely as the base alloy (patent No. 2,086,098). This metal has been found to provide a great increase in hardness and wearing qualities, accompanied by improvement in machinability. It is claimed that this is the first time increased hardness has been achieved without increased difficulty in machining. For example, Super A Meehanite at 269 brinell was found to machine 20 per cent faster than alloy cast iron at 207 brinell.

Super WH Meehanite is a wear-resistant material possessing a combination of physical properties and may be made with brinell hardnesses up to 578, according to the service requirements of the application. This metal has found practical use in castings subjected to extremely severe wear, such as ball mill liners, muller tires, and pan bottoms.

New Work on Protective Coatings for Metals

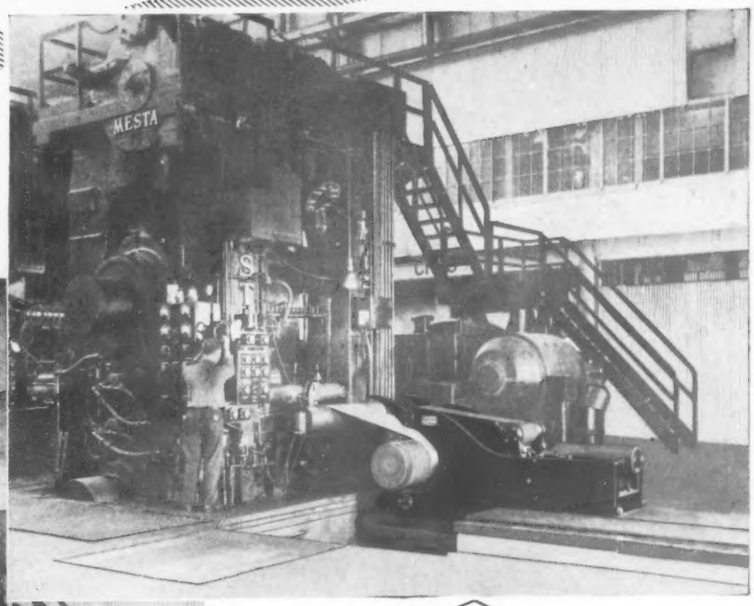
■ *Protective Coatings for Metals*, by R. M. Burns and A. E. Schuh; cloth, 407 pages, 6 x 9 inches; published by Reinhold Publishing Corp., New York; supplied by STEEL, Cleveland, for $6.50; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminister, London S. W. 1.

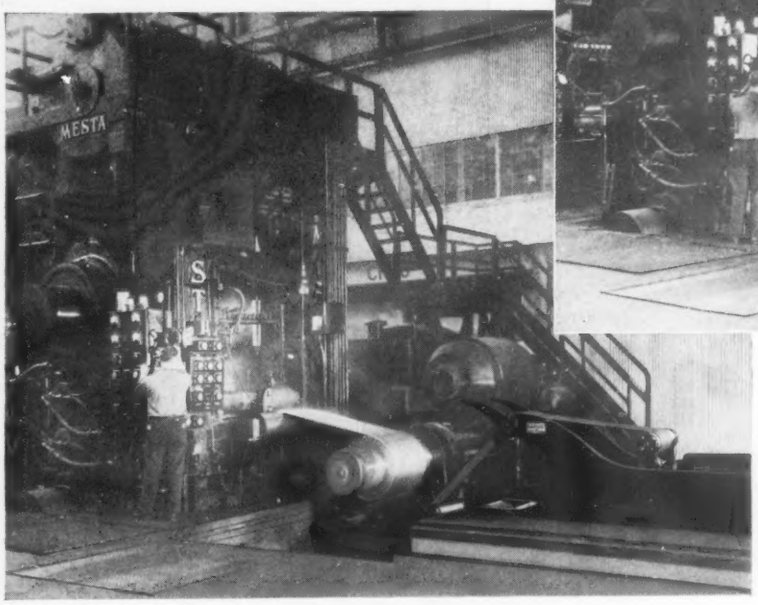
This is one of the monograph series by the American Chemical society. Some years ago H. S. Rawdon's *Portective Metal Coatings* appeared as a number in this series. When about three years ago revision was needed Mr. Rawdon was unable to undertake the task and the present authors were invited to undertake it. It then was decided to enlarge the scope to include all types of protective coatings, including paints.

Owing to great technological progress and thousands of papers on protective coatings appearing in the past decade it was decided a new treatise was demanded.

The present volume is intended for those who have problems of protection and is not intended as a manual for the production of protective coatings, though considerable information is given on this phase to afford the reader a better understanding of the nature of various coatings.

MESTA
BELT WRAPPER





Belt wrapper in working position on 54″ Four Stand Tandem Cold Mill at Jones & Laughlin Steel Corporation.

Belt wrapper in retracted position on same mill.

Mesta Belt Wrappers, for installation on Cold Mills, are built for hydraulic, air or motor operation.

MESTA MACHINE COMPANY · PITTSBURGH, PA.

AVOIDING "TROUBLE"

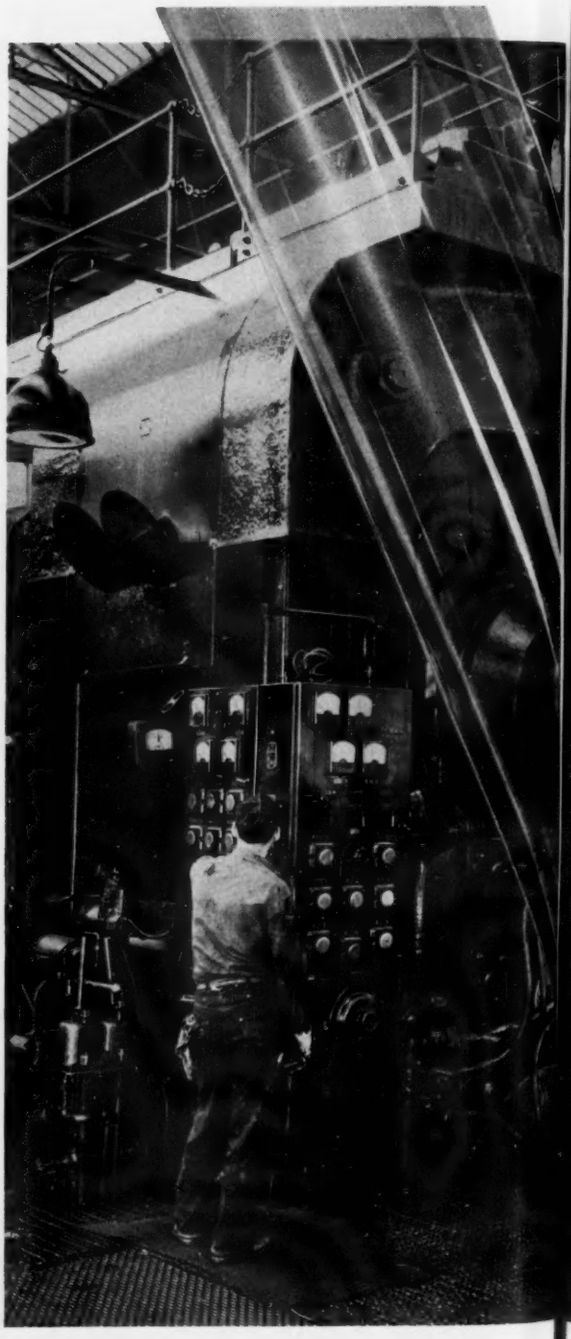
Save Costs

THE SUM OF THESE FOUR SAVINGS

4

1. REDUCED POWER CONSUMPTION
2. MORE CONTINUOUS PRODUCTION
3. DECREASED MAINTENANCE
4. LOWER LUBRICATION COSTS

= LUBRICATION PROFIT



EXECUTIVES who are probing costs soon find that "trouble-free" operation is not enough. Machines that seem to be running smoothly...

—may be slowing up production, requiring too much power, too much oil, and even too much maintenance!

These are profit leaks the Socony-Vacuum man is trained to ferret out. His backing of 73 years' experience enables him to give sound engineering advice in effecting economies, and to recommend Gargoyle Lubricants exactly right for every use.

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General Petroleum Corporation of California

Graphic Instruments

In steel and metalworking plants afford possibilities of definite savings in power consumption. Also found useful in determining motor capacities, finding causes of trouble, and in obtaining engineering information for new or revised drives and equipment

■ MANY OF the improvements in metal producing plants during the past ten or fifteen years have been accompanied by increased emphasis on the part the electrical department plays in plant operation. Graphic instruments have been extremely valuable in a number of cases, several typical examples of which are given here.

The field for graphic instruments in steel plants includes not only in recording purchased power, determining motor capacities, finding faults in machines or causes of failures but also for obtaining engineering information for new equipment design or revising plant operation as well as similar studies.

Data Easily Obtained

In covering a large plant, the work of the electrical department can be done more thoroughly and with fewer men by using instruments which can be connected in circuits and left to record the required data. One man with a number of instruments can be obtaining information at a number of places simultaneously on record charts.

In steel mills, equipment must be kept going. If at all possible, electrical or mechanical weak spots should be found and overcome before failure occurs. When trouble does arise, the more information available regarding normal operation of equipment in distress, the quicker can the difficulty be solved. Thus it often pays to obtain graphic charts showing normal operation of each piece of equipment. These should be indexed and filed. By making such tests once or twice a year and comparing them with previous records, many causes of possible future trouble can be found and eliminated before difficulty occurs.

When something does go wrong with a piece of equipment, the first thing to do is to make another chart of its performance. By comparing this chart with those on file, it often is possible to see what change has taken place and to analyze the difficulty at once. It is not uncommon for medium size steel and wire mills to have a total maximum monthly demand of 8000 to 12,000 kilowatts. Such mills may have a connected motor horsepower of 25,000 to 40,000, comprising from 800 to 1200 motors ranging up to 6000 horsepower in size.

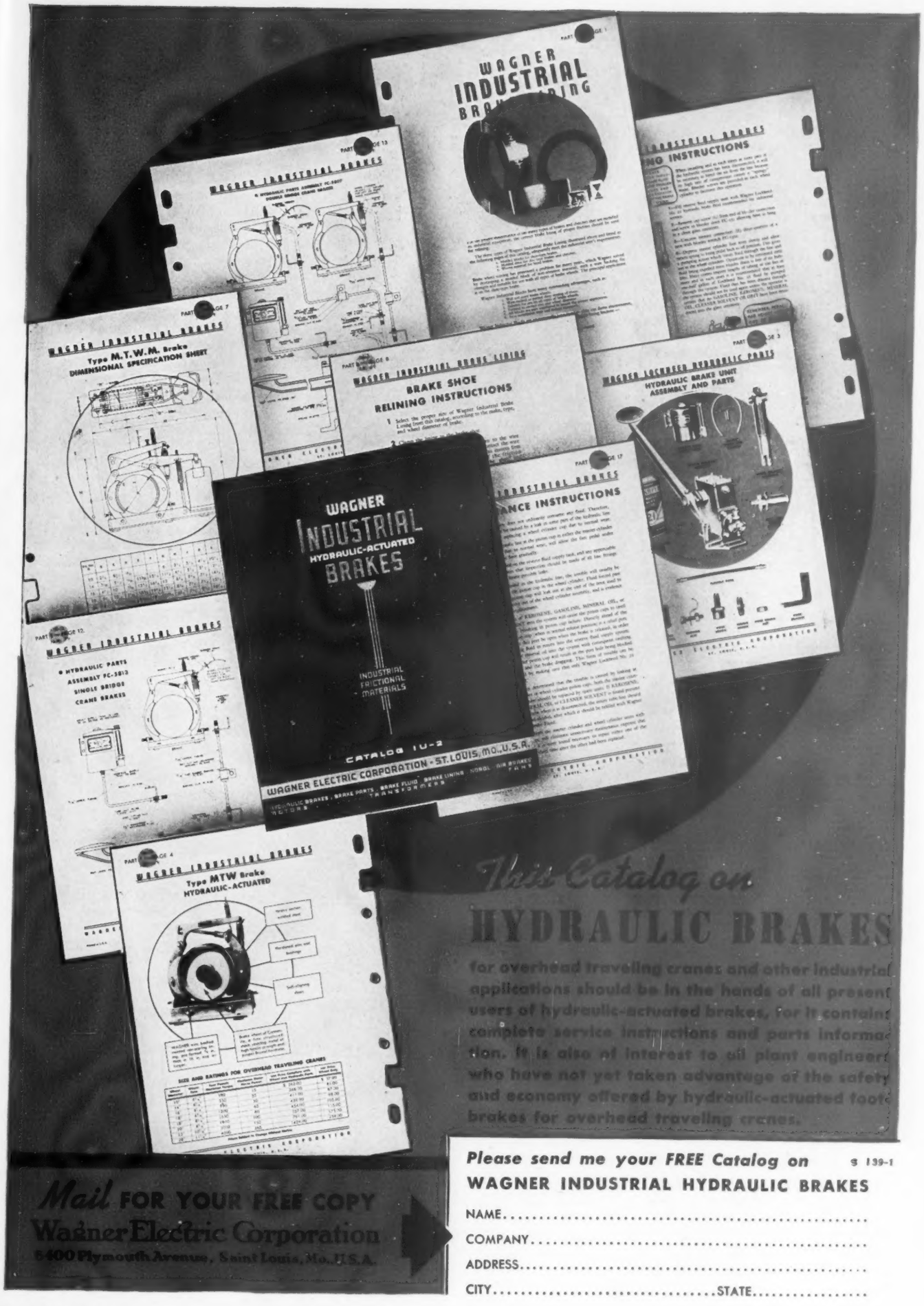
To make it easy and convenient to connect graphic instruments in rotor and feeder circuits, a portable test set containing the graphic meter with transformers, fuses, switches and cable connections all mounted on the roller truck will be found a convenient unit. With such equipment available at a moment's notice, it is only a matter of minutes to connect the equipment in a circuit.

Aid New Designs

Aside from routine surveys of the plant to determine how each piece of equipment is doing its work, graphic instruments are useful in connection with the design of new equipment, in determining capacities and characteristics of motors for driving new machinery when plant extensions are being planned, in discovering power wastes, and in checking up in distribution voltages plant power factors and maximum demands.

A nail cleaning department of a plant complained that two 40-horsepower motors driving rattlers on a nail mill were tripping out of circuit too frequently, causing serious production delays. A graphic wattmeter was immediately connected in one of the motor circuits and in 20 minutes the foreman of

Fig. 1—Hot bed where 30-foot red hot billets are allowed to cool. Motor operating this bed must push 60 tons of steel sideways 200 times an hour. Graphic instruments help in setting controls for this motor so motor could handle the job without damaging equipment or overloading itself



This Catalog on

HYDRAULIC BRAKES

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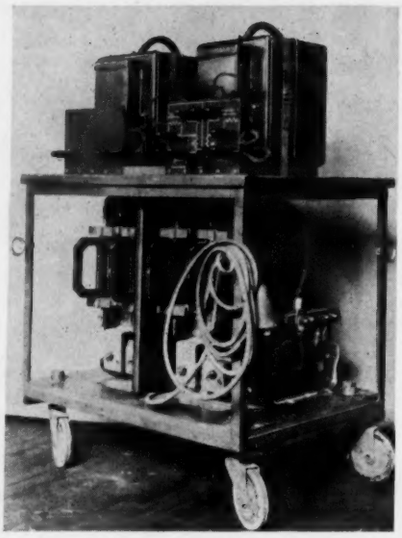
Fig. 2—Portable graphic meter testing setup employed in one plant enables quick transfer of all necessary instruments to any point desired. All illustrations courtesy the Esterline-Angus Co., Indianapolis



the nail mill received instructions to see that the correct amount of nails was placed in each rattler. The trouble ceased and the output of cleaned nails increased.

The chart obtained by the graphic wattmeter had indicated the trouble. These rattlers are large steel cylinders rotated in groups of 12. They are partly filled with nails and a small amount of sawdust. The weight of a charge varies from 1000 to 3000 pounds of nails depending upon the kind being cleaned. The void left when charging the drum causes the nails to tumble about, resulting in their becoming clean and bright.

If too large a quantity of nails is put in a cylinder, their movement is restricted and the cleaning process is slowed up. If the charge is too small, the cylinder is thrown badly out of balance causing the motor on the machine to be overloaded periodically and reducing the tonnage cleaned.

The trouble in this instance was due to carelessness in charging the drums, the correct void not being produced, so operation was overloading the motors. Unbalance of some of the drums produced excessive peak loads on the motor causing it to trip out. This study thus not only solved the trouble but increased the output of the department as well.

In another example, a new cooling bed was installed in the rolling department where billets come from the billet mill and are allowed to cool. These billets are cut into 30-foot lengths while red hot and then are run out on the cooling bed which holds about 200 billets, allowing them to cool about an hour. When a billet reaches the cooling table over a system of motor driven rollers, it closes a flag switch which starts the pusher motor. The pusher moves the 200 cooling billets sidewise, dropping a cooled billet on the conveyor and making room for the one which is to follow.

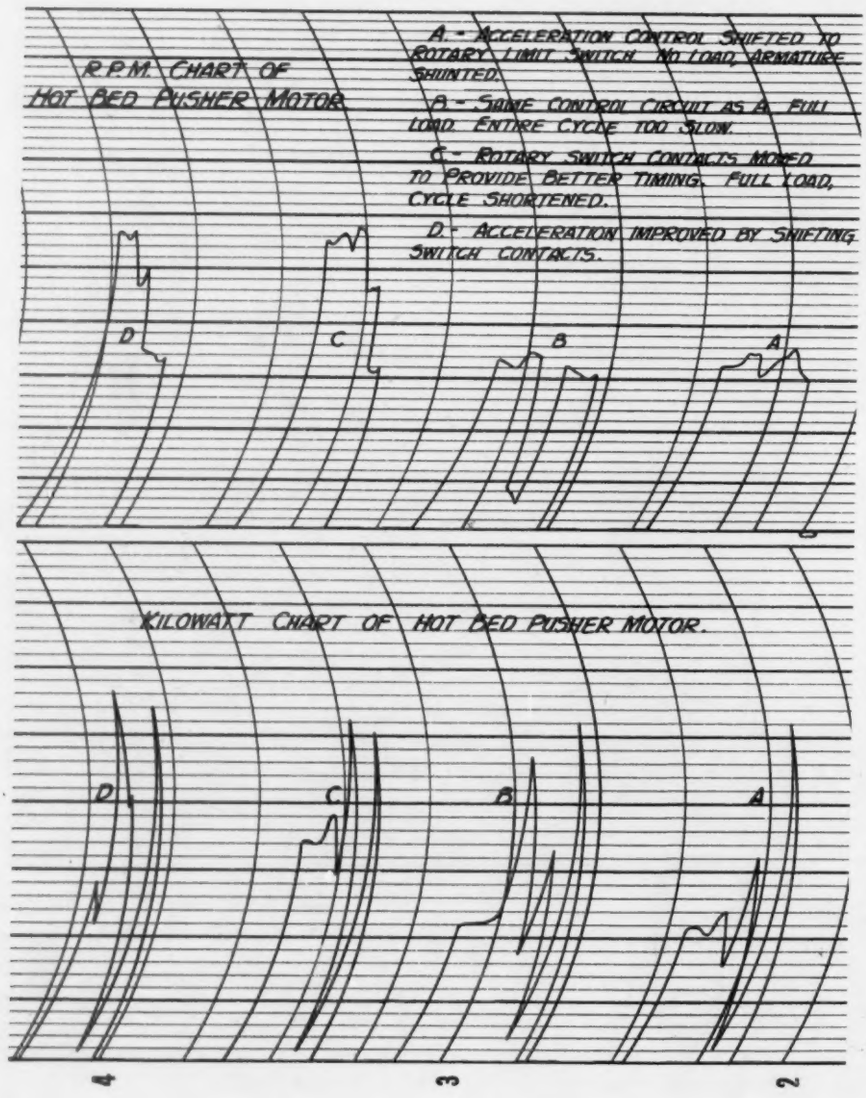
As soon as the flag switch closes, the motor control circuit is energized to start the pusher motor. This in turn operates contacts in a rotary limit switch to govern the remainder of the cycle. The 200 billets on the bed represent a dead weight of 60,000 pounds which must be moved 200 times per hour, one cycle each 18 seconds. Although the entire equipment was carefully designed, trial operations showed that modifications would be necessary to adapt the equipment to the requirements.

Guide to Control Adjustment

A graphic wattmeter was connected in the motor circuit and a graphic speed recorder on the motor. From records obtained it became possible to work out the controls so the pusher bar would not come up against the 60,000-pound dead load with such an impact as to strain the machine and foundations. The controls were adjusted to apply power to start the load gradually, dynamic braking circuits were adjusted and the entire setup arranged to permit the motor to complete the cycle in 18 seconds without overloading.

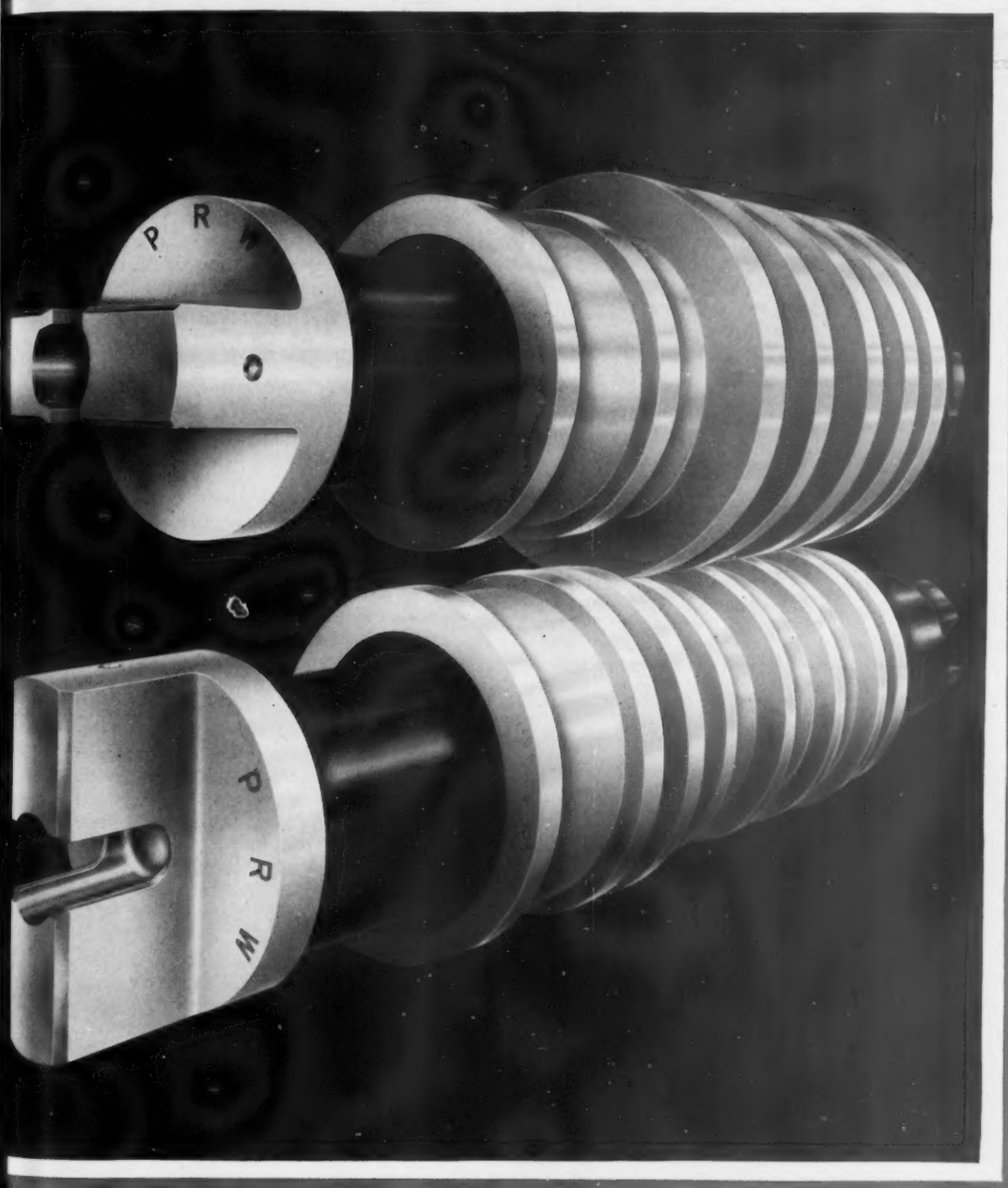
Final adjustments were made by a cut-and-try method. A change was made and then the graphic records of speed, acceleration or deceleration were studied and further changes or adjustments made. Then another test was recorded and the process repeated until the desired operation was attained.

In another case, it was decided to increase the capacity of an open


R.P.M. CHART OF HOT BED PUSHER MOTOR
A. - ACCELERATION CONTROL SHIFTED TO ROTARY LIMIT SWITCH NO LOAD, ARMATURE SHUNTED.
B. - SAME CONTROL CIRCUIT AS A. FULL LOAD. ENTIRE CYCLE TOO SLOW.
C. - ROTARY SWITCH CONTACTS MOVED TO PROVIDE BETTER TIMING. FULL LOAD, CYCLE SHORTENED.
D. - ACCELERATION IMPROVED BY SHIFTING SWITCH CONTACTS.
D
C
B
A
KILOWATT CHART OF HOT BED PUSHER MOTOR.
D
C
B
A
4
3
2

Simultaneous records of pusher motor speed, Fig. 3 at top, and of kilowatt input to motor, Fig. 4 at bottom. They show how the control equipment was adjusted to give the operation desired

LESS COST per Ton of Steel Rolled



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hearth furnace. This called for increased duty on the exhaust heat fan to lengthen the roof life. The fan in use was driven by a 100-horsepower motor and the increased capacity required 140 horsepower. There was a 40-horsepower motor available so it was decided to couple the two in tandem, using the 40-horsepower motor as a booster above the point where the load exceeded the capacity of the 100-horsepower machine. This promised to increase the operating efficiency and obviate the expenditure of approximately $1500.

Load Division Effected

However, it necessitated developing a control system to divide the load between the two motors accurately. In working on the control system adjustments, two graphic wattmeters were used, one in the circuit of each motor. By comparing records with each setting of controls it was a relatively simple matter to make the adjustments required. This job was done over a week-end. Without the graphic instruments it would have taken a much longer time.

In another case difficulty was encountered with a large spot welder using a depth switch to control welding time. Investigation disclosed that the trouble was due to a faulty design and correcting it involved a radical change in circuit control coupled with the addition of an annealing action after welding took place.

An arrangement for timing of the weld was substituted for the depth switch and the annealing action was accomplished by lowering primary voltage for the required period. Timing of the welding and annealing sections of the operating cycle was accomplished by rotating cams, having adjustable surfaces. The setting of these cams and determining of their surface lengths could not be guessed at if success was to be attained, so a graphic wattmeter was used to check the adjustments. With this instrument it was easy to obtain the desired settings.

Etching In Monel-Metal

■ The preparation of etched monel metal nameplates, identification tags or novelties is accomplished directly through wax or varnish resists, or photographically with sensitized gelatin tissues. According to a recent issue of *Nickelsworth*, published by The International Nickel Co., New York, a most satisfactory etching solution for use with either method is that made up from 50-degree Be iron perchloride solution. The 50-degree Be solution will contain 53 per cent by weight ferric chloride (iron perchloride), or 6.765 pounds of the salt made up to one gallon with water. This solution is used at room temperature, applied directly over the resist or carbon tissue with a smooth felt swab. Two minutes is required for cutting to 0.001-inch or 0.0015-inch, a depth satisfactory for most purposes where all but the highest contrast is desirable. After two minutes the iron perchloride solution softens carbon tissue, so that the etching should then be stopped by rinsing with anhydrous alcohol. The alcohol rinse is desirable with wax or varnish resists to prevent undercutting.

Fine Metal Shot Aid X-Ray Photography

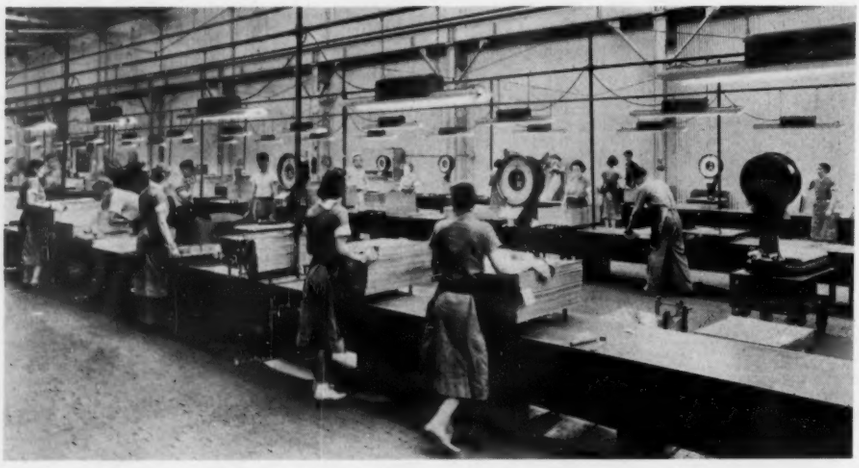
■ Metal shot, some so fine they float on water, play an important part in making sharply defined X-ray photographs of irregular metal objects in the laboratory of the General Electric Co., Schenectady, N. Y. Should an X-ray photograph of a monkey wrench be wanted, for example, the technicians would pour shot over and about it—spherical particles of copper or steel so small that 10,000,000 of them nestle together in a cubic inch of space. The photograph then obtained has all the edges of the parts of the wrench sharply outlined. Had a similar photograph been made with the wrench simply resting on the X-ray negative holder in the air, the resulting picture would have had blurred edges outlining the tool.

The explanation, according to C. D. Moriarty of the works laboratory, is that there is such an emphatic difference in the absorption of X-rays by air and by metals that the part of the X-ray negative not in back of the metal is necessarily over-exposed, with the result that the exposure "spills over" and blurs the edges of the object. Again, when the object being examined has some sections much thinner than other parts, there is a similar fuzziness of edges.

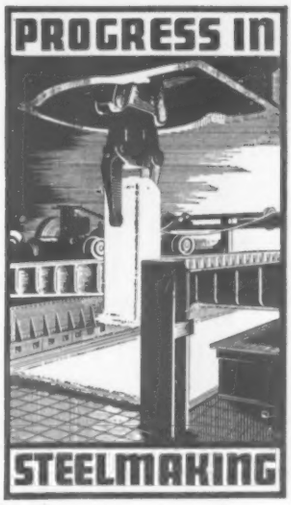
Utilizing metal shot, an almost unlimited range of absorption coefficients is obtainable, depending on the metal used. The uniform packing of the fine spherical particles assures homogeneity. Technicians can use the short-exposure films with intensifying screens and obtain greater contrast and detail in the radiograph.

The copper shot used in "blocking" an irregular steel object give a background that approaches the opacity of the object, but still is sufficiently less opaque so that the radiograph of the object stands out in contrast. The copper shot used must be extremely fine so they will "flow" freely to fill all crevices, and pack uniformly — as only spheres will—to give a homogeneous background. They are produced by a special process developed in the laboratory. For some investigations, calling for "blocking" with materials of other densities, similar shot of steel or alloys are employed. The shot "float" on water, since the surface tension of the water is enough to withstand the weight of the particles.

Dial Scales Check Material and Gage



■ **More than fifty portable dial scales which reach balance very quickly speed up weighing in this tin mill inspection department. Mounted on trucks, scales are wheeled to inspectors who, after inspecting and counting sheets, check for material and gage by weight. Large dials on scales reduce visual errors and eliminate mental calculations. To stabilize pile of sheet, scale platforms are made larger than usual. Photo courtesy Kron Co., Bridgeport, Conn.**



Tension Control

System is developed to afford automatic indication and control of tension between stands of tandem hot and cold rolling mills. Also instantly shows out-of-level conditions thus aiding in maintaining more uniform gage crosswise the strip

By C. M. HATHAWAY
And
F. MOHLER
General Electric Co.
Schenectady, N. Y.

■ THERE IS little doubt that proper control of tension in cold strip rolling offers a most important key to higher rolling speeds, lower maintenance, better gage accuracy and greater production of fine quality strips. The tensiometer described here not only affords a means of measuring tensions between the stands of continuous hot and cold mills, but goes a step further. It also functions with other control equipment to maintain automatically any amount of tension desired. Also it permits instantaneous indication of any difference in tension between the two edges of the strip, a feature most important in obtaining uniform gage crosswise the strip.

Accurately maintained tension between stands of a tandem mill is extremely important since it makes greater reductions possible, permits a greater number of elongations to be made without intermediate annealing to soften the strip and at the same time produces a flatter and smoother strip. Furthermore, much can be done to compensate for defects in roll shape, strip lubrication, mill housing stretch, etc., if the tension can be manipulated properly.

To control tension, it first must be measured. So far, only two methods have been discovered for measuring tension: First, by electrically measuring the input to the motor producing the tension; second, by mechanically measuring the tension itself.

The first method is not practical, however, because in all probability the rolling load represents 90 per cent and the tension only 10 per cent of the motor input. Since it is quite possible that the rolling load itself may vary 10 per cent plus or minus, this would be equivalent to a variation in tension from zero to 200 per cent, which immediately makes this method impractical.

The major difficulty encountered with mechanical control devices has been due to inertia of the moving parts. Usually an auxiliary roller is employed in such a way that the tension of the strip passing over it displaces the resiliently mounted roller an amount which indicates the tension. However, if this roller has to move an appreciable distance, troubles are experienced in high-speed rolling due to inertia forces of the roller itself. Thus, strip tension could change considerably before the roller could be accelerated and moved to its new position.

The tensiometer makes use of this general scheme but employs a sensitive electric gage to measure the roller deflection so an extremely small roller movement affords the desired indication. The natural frequency of the roller can be made high enough to eliminate troubles resulting from inertia of moving parts in this system.

In addition to the tension problem, there has been a great need for some method of indicating whether the strip was the same thickness throughout its width. One edge can be measured with a flying micrometer but not the entire width. However, if one edge is the proper thickness and the tension is the same in both edges of the strip, it is

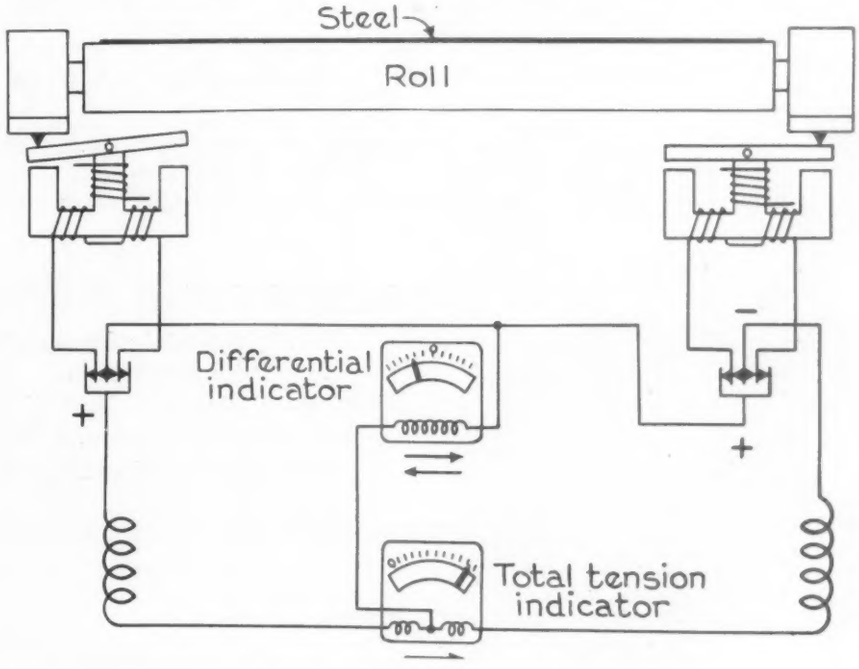
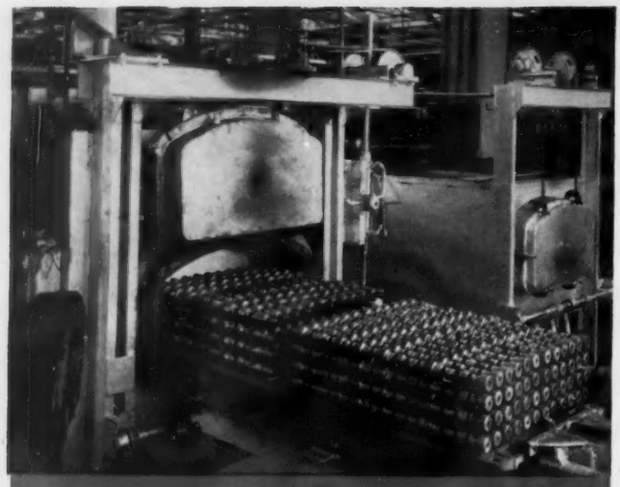


Fig. 1—Schematic diagram of tensiometer as used in rolling mill equipment to measure and control tension and to indicate tension differences between the two edges of the strip



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METAL SHOW ISSUE OCT. 16th

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■ The latest methods, materials, equipment and metals will be on display when the twenty-first National Metal Congress and Exposition is in session at the International Amphitheatre, Chicago, Oct. 23 through 27. The papers presented at the business sessions will reflect the best thinking and most exhaustive research done over the past year. This is truly the "metal man's" greatest opportunity for an interchange of ideas and to learn of the latest developments.

Following its usual custom, STEEL will devote a large part of the October 16 issue to the same interests as the various societies participating in the National Metal Congress. This issue, dated just a week prior to the opening of the show, will carry complete advance details so that you can lay your plans as to the papers you wish to hear, the things you wish to see and the booths you would like to visit.

Our October 16 issue will contain a combined advertising and editorial insert section printed in two colors on special coated stock. This insert section will carry the complete program and list of exhibitors. In addition, it will feature pertinent comments by men known and respected throughout the industry. It will have a profusely illustrated section depicting the progress and achievements of the past year.

The advertising pages will inform you of the newest money saving equipment; of better methods; of improved materials and metals. If you attend the show, STEEL'S October 16 issue will help you to profitably plan your time. If you can't attend, this issue will bring the show to you.

Companies supplying equipment, materials, methods or metals are invited to write for information relative to advertising possibilities.

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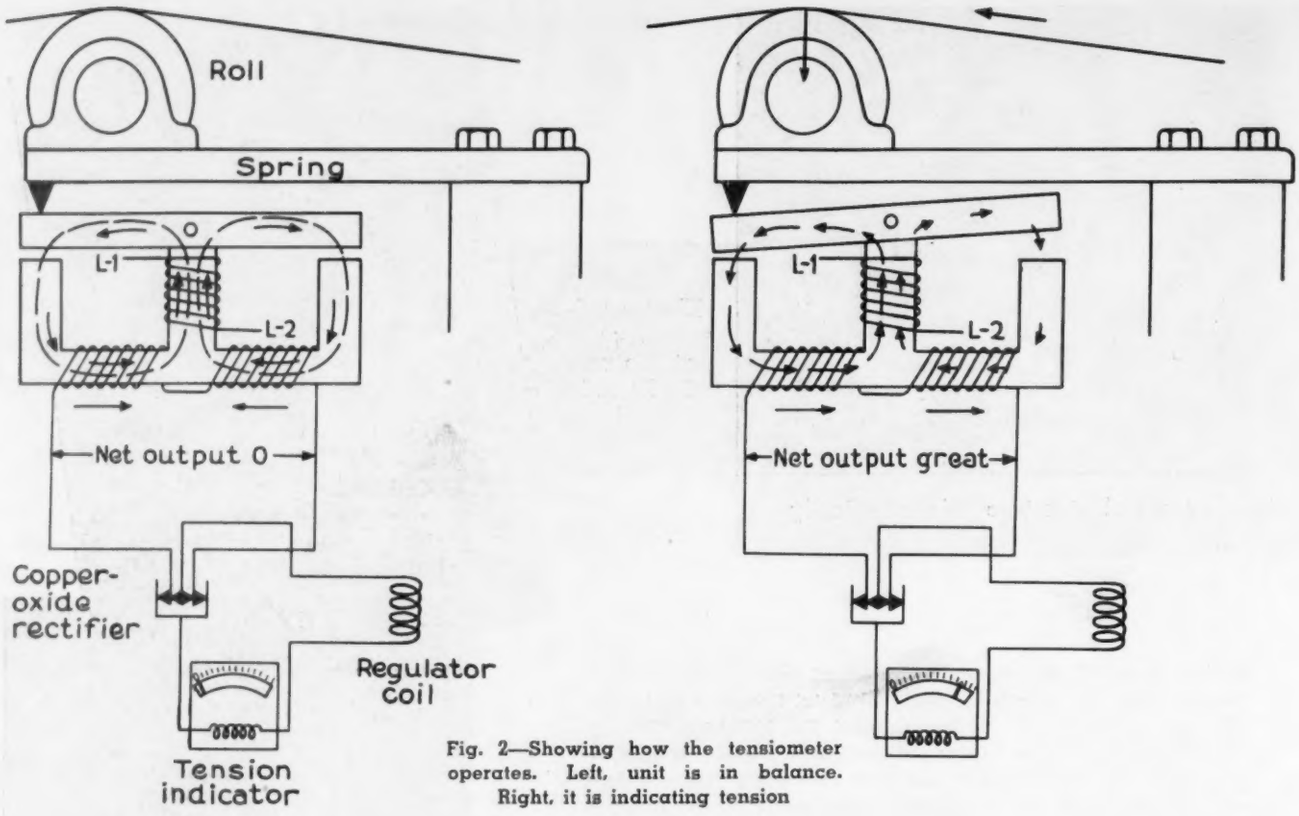


Fig. 2—Showing how the tensiometer operates. Left, unit is in balance. Right, it is indicating tension

reasonable to assume that the thickness of the other side is the same as the side measured. If the other side is thicker, the tension will be greater on that side, and vice versa. This differential tension or level indication can also be obtained with the tensiometer. The system described here not only produces a continuous indication of the total tension and a sensitive indication of any out-of-level condition but in addition operates standard control equipment to maintain automatically the total tension at any desired value.

The tensiometer measures the total tension by measuring the force necessary to deflect the strip a given distance from the normal pass line. As the strip passes from one mill to the next, it is caused to pass over a roller located so as to deflect the strip a small distance from the normal pass line. A force is thus produced on the roller at right angles to the normal pass line and this force is proportional to the total strip tension. The arrangement is shown in Fig. 1 where the strip is seen traveling over the pass roller of the tensiometer.

Each end of this pass roller is mounted by means of antifriction self-aligning bearings on a stiff cantilever beam and the deflection of each beam when a load is applied to the pass roller is measured by an electric gage. This is a device capable of modulating or controlling an electric current in proportion to a small linear displacement. Each electric gage has an output directly proportional to the deflection of the beam to which it is attached and therefore to the vertical load supported by the beam.

The sum of the outputs of the two electric gages is proportional to the vertical load applied to the pass roller and this in turn is proportional to the total strip tension. The outputs of the two gages are added by an instrument calibrated directly in thousands of pounds total strip tension. A second instrument indicates any difference in output between the two gages, thus immediately showing any out-of-level condition that may exist in the mill.

Design of Gages

These electric gages consist of a stack of E-shaped laminations mounted adjacent to a laminated structure as shown in Fig. 2 with a small air gap between the two. The armature is supported at its center on knife-edge bearings so a movement will increase the air gap at one end and decrease it at the other. On each of the outer legs is a primary and secondary winding. The primary windings are connected in series across the alternating current power source and in such a direction that the resultant flux add when passing through the center leg.

The secondaries also are connected in series but in such a direction that the resultant flux due to secondary current will flow around the outside of the laminated structure rather than through the center leg. The result of these connections is that the induced voltage across the secondary terminals will be zero when the armature is at its mid position and the air gaps are equal. In this position the voltages induced in the two secondary coils are equal and opposite.

Any displacement of the armature from this position will decrease one air gap and increase the other causing an unequal distribution of flux resulting in a voltage appearing across the secondary terminals. This voltage will be a function of the armature displacement and so the device can be used to measure the deflection of the springs supporting the pass roller. The secondary output is rectified by a copper oxide rectifier shown in Fig. 2, and this direct current output then is used to operate the indicating instrument and the control equipment. A condenser connected across the secondary terminals greatly increases the sensitivity of the gage because of the voltage rise produced by the passage of the leading current of the condenser through the leakage reactance of the secondary.

To indicate the tension at each edge of the strip, two electric gages are employed, one at each end of the pass roller. The outputs of the two gages then are added to obtain total tension and any difference between the outputs will indicate an out-of-level condition.

In some cases it may be desired

to roll strips of a wide range of width and thickness in the same mill. In such cases the total tension may vary over such wide limits that it is necessary to provide some means for changing the scale of the tensiometer. This could, of course, be done by changing the springs on which the pass roller is mounted. However, it can be done more easily by changing the mechanical ratio of the linkage between the pass-roller bearings and the electric gage armatures. A number of tensiometers already are in use equipped with such a variable ratio linkage.

In normal operation, the upper element of the pass roller is located 2 or 3 inches above the normal pass line, and the distance between spans is usually of the order of 10 or 20 feet. The diameters of the working rolls on the mills on each side of the tensiometer rollers are not fixed but decrease with time due to wearing and resurfacing. Thus, the normal pass line varies by as much as several inches. This means provisions must be made for conveniently adjusting the elevation of the pass roller above the normal pass line so this value can be maintained at a standard setting. To aid in making this adjustment, vernier height gages are attached to each of the pass roller bearings. These gages are calibrated directly in working roll diameter and must at all times be set to coincide with the average measured diameter of the two lower working rolls in order that tension values be registered accurately.

Control Systems Developed

A number of satisfactory control systems for use in connection with tensiometer equipment to maintain automatically the total strip tension at any desired value have been developed. One system employs a small 150-watt amplifying generator to enlarge the output of the electric gage so sufficient energy is available to operate a constant current regulator. The regulator then is used to control the field current in one winding of a counter e.m.f. generator in the field circuit of the mill motor of the stand preceding the tensiometer.

There is little doubt that the tensiometer will do much to increase the knowledge available of what tension should be used, how accurately it should be maintained and what can ultimately be accomplished by use of tension control.

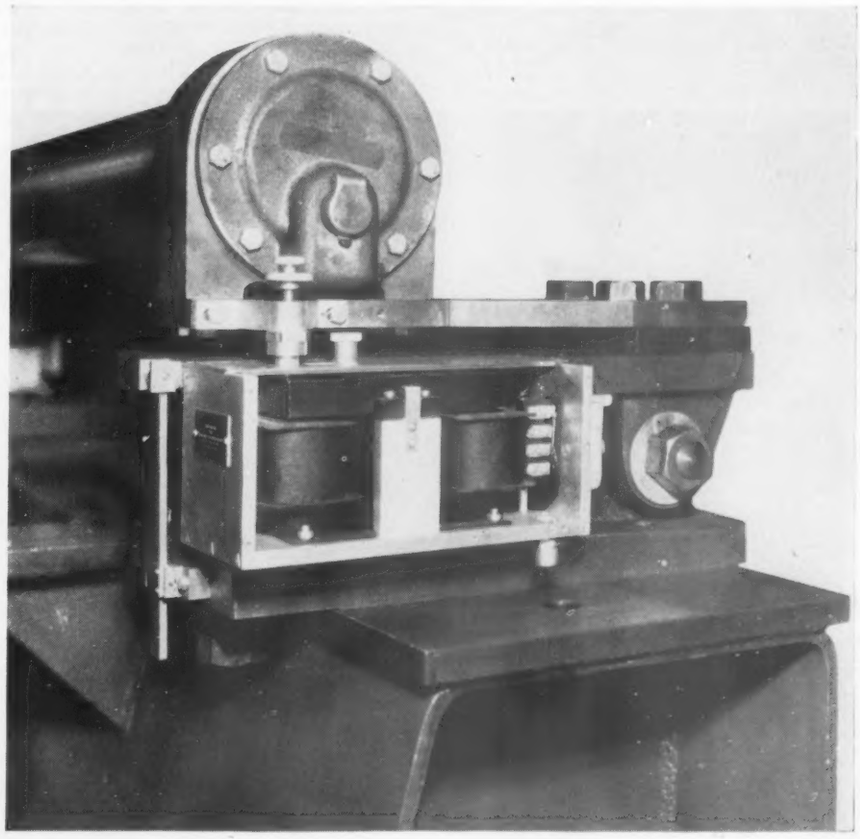


Fig. 3—Closeup of tensiometer at end of tension regulator stand. There is a similar unit at other end of roll stand. Cover is removed here to show inside of unit. Some designs are now built in solid cast-iron cases for maximum protection

Steel Corp. Laboratory Methods Are Published

■ *Sampling and Analysis of Carbon and Alloy Steels;* cloth, 356 pages, 6 x 9 inches; published by Reinhold Publishing Corp., New York; supplied by STEEL, Cleveland, for $4.50; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London, S.W. 1.

This volume covers the methods of the chemists of subsidiary companies of the United States Steel Corp. as revised to 1937. It replaces two former booklets dealing with sampling and analysis of plain carbon steels and alloy steels. The methods include revisions of older methods and some newer procedures found most practicable and otherwise satisfactory for purposes to which they are applied.

For the most part the methods are those actually in frequent use by the several laboratories represented on the committee which compiled the volume, but include also methods seldom required by some laboratories. The volume represents more than two years' cooperative effort by a representative committee from corporation subsidiaries.

Sampling is first taken up and includes everything from the ladle to finished mill products. Qualitative and quick tests for identifying various types of steel are treated next. A chapter is given to methods of analysis and one to chemical separations.

The body of the book is devoted to determination of the various elements and appendices determination of sulphur or carbon and sulphur by combustion in oxygen; methods for determination of oxygen, hydrogen and nitrogen; preparation, pH ranges and color changes of various organic chemical indicators; tables of atomic numbers, atomic weights and other physical constants of chemical elements. Illustrations are largely drawings of apparatus used in tests.

German Institute Issues 1938 Research Reports

■ Twenty reports of research work conducted during 1938 by Kaiser Wilhelm Institut fur Eisenforschung (Kaiser Wilhelm Institute for Iron Research), Dusseldorf, Germany, are now available in bulletin form. In 1938, the bulk of the subjects investigated was metallurgical, both on the physical and on the chemical side. The mechanical side was less emphasized than in other years.

Printed in German, the bulletins may be obtained singly or as a set. Titles and prices will be furnished either by the institute, or by G. E. Stechert & Co., 33 East Tenth street, New York.

Tablet-Arm Chairs

Combination of structural steel shapes and arc welding brings new standard of durability to this type of chair. With original cost near that of other designs, these units stand up 100 per cent in 4-year test in hardest service, practically eliminating item of maintenance

By E. J. FREEMAN
Associate Professor
Clemson College
Clemson, S. C.

■ TO MORE NEARLY meet all requirements, a new type of steel frame lecture room chair which appears to eliminate maintenance expenses and seems practically indestructible was built and tested. First, an extended study was made of all important features necessary for adequate service.

In the college were found some 1600 lecture room chairs with tablet arms. These include 47 different designs and the following types of construction: All wood with four legs; wood with steel bracing and four legs; wood bench type, four seats together; pressed steel frame, riveted, with four legs, wood seat and tablet arm; bolted steel frame construction with single-column cast iron base, wood seat and tablet arm.

Rating then was made according to appearance, comfort and utility, initial cost, durability, time between repairs, cost of repairs, janitor cost, cleaning, etc. It was found that the first requirement could be met in any of the types and was a function of the initial cost. No chair showed, to a high degree, all desirable qualifications. All data pointed to the fact that use of steel construction raised the desirability rating in the majority of cases.

As an experiment, 60 chairs were designed and built, the frames of which were entirely of arc welded structural steel. Tablet arm and seat were of oak. The design stressed the one feature, durability. Placed in a class room which was employed for football meetings, in addition to its normal use, they were given a severe test for over four years. Every chair is still in perfect condition. See Fig. 1. None of the 47 different designs mentioned above stood up one hundred per cent for even half that period.

Abstract from paper receiving first main award, $3,764.94, in Furniture & Fixtures classification of $200,000 program sponsored by James F. Lincoln Arc Welding Foundation, Cleveland.

New Design Improves Chair

After this 4-year test, a chair was designed to adhere to the construction details of the tested chair and at the same time to meet all of the other requirements listed above. This arc welded steel-frame lecture-room chair, Fig. 2, has the frame made in one unit of welded standard steel sections. Base is a single column. Seat is supported by two cross members connected with column cap by U-shaped channels. Front cross member is bent upward to support one end of the angle iron to which the tablet arm is screwed. Sides and back of seat are continuous angle section. Back rests are round edge flat steel, crimped and curved. Angle sections are used for the tablet arm support.

Five-piece seat and tablet arm are of rift-sawed oak, fastened with screws. Tablet arm is one piece, held in position by screws. There is a minimum of parts since no bracing is required. Shape of chair is designed to permit the student to forget his physical position and concentrate on mental work. A small

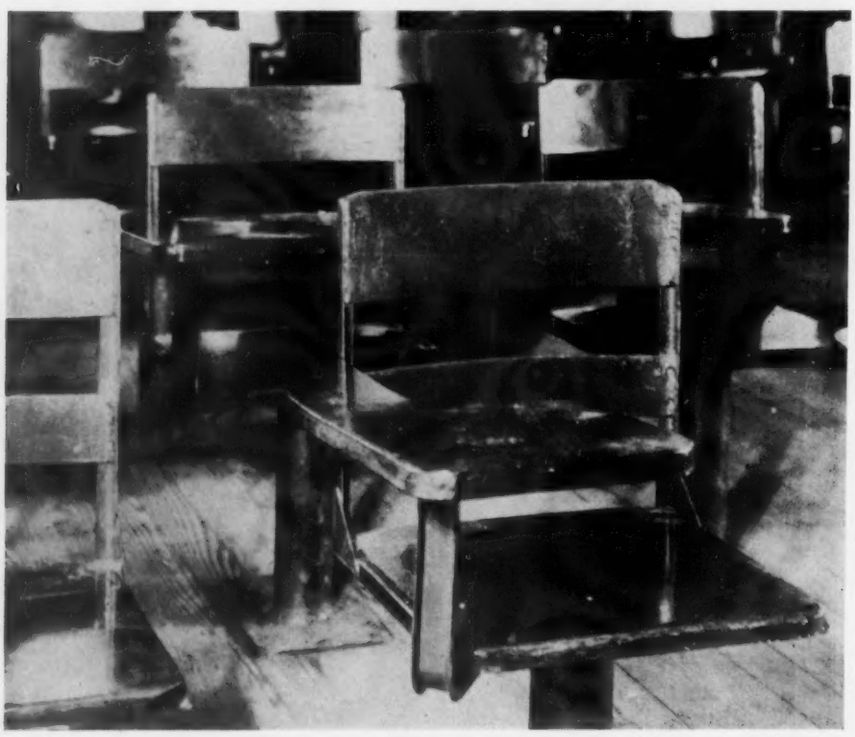
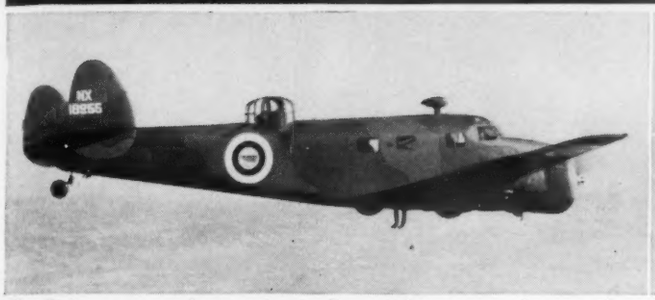
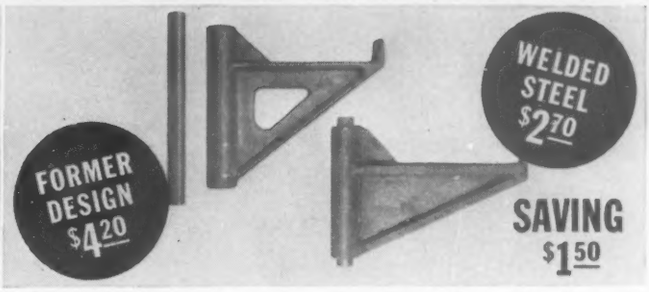


Fig. 1—Original design which withstood four years of heaviest service on a test with no maintenance whatever being necessary during this period

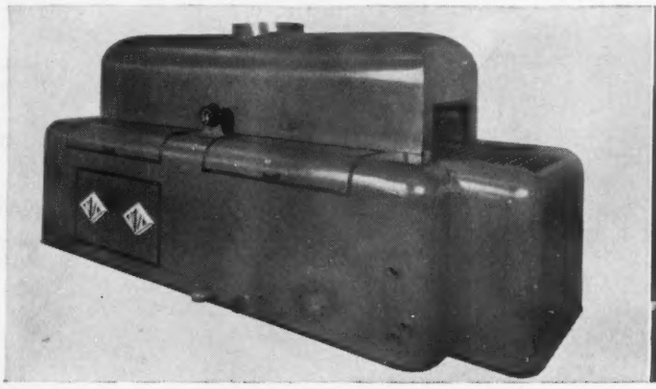
DID YOU KNOW THIS *About Welded Design?*



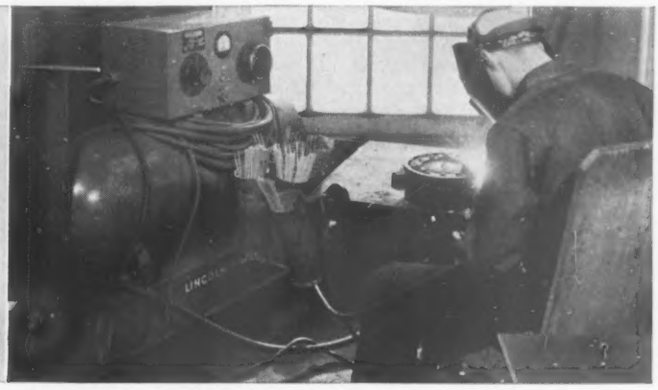
1. Exhaustive tests by aircraft manufacturers have proven the strength-superiority of the shielded arc process for welding critical parts such as landing gears and engine mounts. Inspection of a shielded arc weld shows you how perfect it is. And with proper procedure, it is usually stronger than the parent metal! *Photo courtesy Lockheed Aircraft Corp., Burbank, Calif.*



2. Welded steel design cuts costs by reducing the weight of material and by simplifying manufacture. Usually, the larger the part the greater the savings, although many small parts such as the swinging bracket illustrated above can be weld-economized. Try it! *Courtesy Rogers Bros. Corp., Albion, Pa.*



3. Products are more saleable when they are streamlined by welded design. Example: The welded steel conveyor washer illustrated above. In this case, welding also has made production more flexible for special designs and has made possible a construction that is permanently leakproof. *Photo courtesy International Conveyor & Washer Corp., Detroit, Mich.*



4. Welding simplifies the development of new and improved products. Here is a new type of electric cooking unit—operating by induction rather than resistance. Its construction is made possible by welding. The New *"Shield-Arc"* simplifies welding of its high silicon steel. *Photo courtesy The Griswold Manufacturing Co., Erie, Pa.*

5. To minimize costs on heavy machine parts: Form steel plate—hot if necessary—on brakes. Machine before welding. Use heavy fixture and positioning jig, so as to allow high-speed welding with large electrodes in down-hand position. *Photo courtesy Wellman Engineering Co., Cleveland, Ohio*

6. By cutting costs and improving products by means of welding, many engineers and production supervisors have gained recognition in the eyes of the management resulting in advancement and increased earning power. It pays *you* to push changeover to welded design!

For further details, consult the nearest Lincoln office or mail the coupon

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space is provided under the chair for hat and books.

Low initial cost was not the primary aim in design of this chair. Stress was laid on raising the value of the finished product by making it meet all utility requirements to a high degree, thus reducing net cost over a period of years.

Cost of manufacture is shown on summary sheet, Fig. 3, data from actual construction. Total prime cost was approximately $271.00 per 100 units, or $2.71 per chair. This compares with $2.74 for an all wood, four legged chair. Costs for other types of construction include: Wood with steel bracing, four legs, $2.90; wood bench type, four seats together with cast iron legs, $2.52; pressed steel frame riveted, four legs, wood seat and tablet arm, $2.68; bolted steel frame, cast iron single column base, wood seat and tablet arm, $2.64.

To obtain the above figures, time studies were taken on the various operations with conditions paralleling as nearly as possible those under which the new design was made. Also material costs were obtained from the present market prices. These costs run in accurate proportion to prices quoted by various manufacturers of these types of construction.

There is no maintenance expense with this new design, however, as it is unnecessary ever to tighten up or repair loose or squeaky joints since the frame is one solid piece of steel. Although the wood is held in place by screws, no load is put on the screws and no wood is depended on for strength or rigidity.

The shelf is small, easily accessible and well clear of the base. It holds books and hat without collecting excessive dirt. The base is thin edged and the column round, presenting no cracks or corners to catch dirt being swept over the floor. Resistance to broom or cleaning equipment is reduced to a minimum. A series of time studies has revealed that, aside from the fact that a much better floor cleaning job can be done around the column base chair, the time saved will reduce the janitor labor cost a surprising amount. This saving alone will pay about half the interest on investment on chairs.

TABLE I—COST SUMMARY

Item	Materials (direct) $	Materials (indirect) $	Labor (direct) $	Labor (indirect) $	Power $	Total $
Steel (cut, formed)	121.34	.32*	12.04			
Set up				2.70		
Machine					2.20	
Steel parts	121.34	.32	12.03	2.70	2.20	138.60
Wood (cut, shaped)	20.12		3.32			
Set up				2.95		
Machine					1.37	
Wood parts	20.13		3.32	2.95	1.37	27.77
Assembly						
Set up jigs				.26		
Set up parts			10.12			
Weld	12.00		31.75		1.95	
Final	3.88**		3.40			
Assembly	15.88		45.27	.26	1.95	63.36
Finish	24.83		16.40			41.23
Cost per 100 units	182.18	.32	77.03	5.91	5.52	270.96

* Furnace fuel.
** Screws.

Advantages of this arc welded steel construction over conventional types include: Attractive appearance, brought out by simplicity in design and by use of a minimum number of parts; extreme durability, obtained by welding the complete frame, thus leaving no joints to work loose; comfort, emphasized by the curve and tilted seat which is voted by students as better than the conventional saddle seat; the small hat and book shelf, easily accessible for cleaning and too small to collect trash; the thin edge base with single round column, presenting minimum resistance to floor cleaning; filleted corners and sealed lap joints, leaving no hiding place for bugs and dirt; sturdy members, having enough elasticity to absorb shock and impact to which the chair is subjected; almost perfect silence, no squeaky joints, obtainable permanently by no other method of construction.

The seat is made in five pieces of simple shape, any one of which can be replaced at little cost. The arc welded chair adapts itself well to changes in size and shape. If chair is to be used on a sloping floor, one part is merely cut at proper angle to take care of the pitch.

Though different branches of education require different articles of equipment, the one necessity common to all branches is the tablet arm chair. Besides being used daily in the United States by over a million college and university students, four million high school students, and an unknown number of primary school pupils, this type of chair is used in night schools, lunch rooms, cafeterias and many other places.

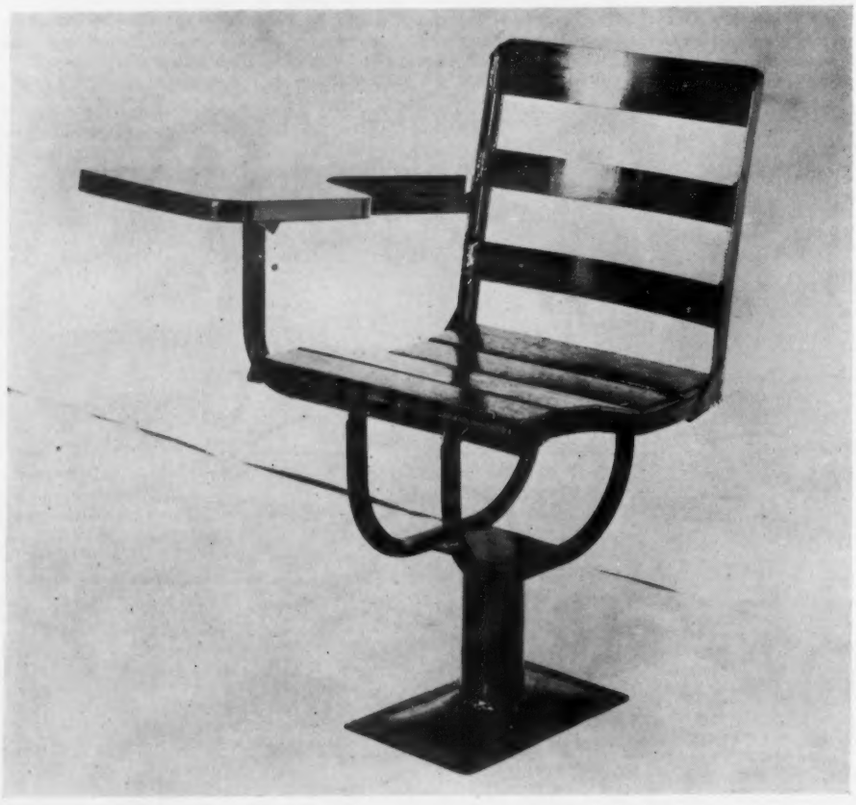

Fig. 2—Final design revised somewhat to include factors of appearance, etc. in addition to retaining durability of original design

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OUR reputation for putting quality into wire is built upon over 100 years of wire-making experience. In that time American Quality Wire has proved its ability to meet the highest quality standards wherever it is used. American Quality Wire is checked at every stage of its manufacture to assure the uniformity that helps to give trouble-free production.

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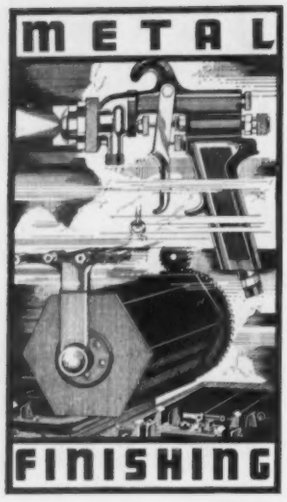


Finishing Die Castings

Unusual automatic polishing and buffing machines feature finishing department of plant making automotive die castings. Automatic plating machines employ a fast cycle

By HERBERT CHASE

ORDERLINESS and efficiency in handling and processing characterizes polishing, plating and assembly work on automotive die castings made at Ternstedt plant of General Motors Corp., Trenton, N. J. All castings are in zinc alloy. Those to be plated are so smooth they require grinding only to remove the parting line left after flash has been sheared off.

Nearly all the grinding is done by hand, using leather abrasive-coated wheels of about 10-inch diameter running at 2200 revolutions per minute. In some cases, a fabric buff placed next to the grinding wheel on the same spindle is used to buff surfaces, such as the curved end of handles, which cannot be reached by wheels in subsequent automatic buffing. Some buffing wheels are equipped with rotating chucks for buffing cylindrical shanks of handles, there being two such chucks 180 degrees apart on a rotating fixture designed so the chuck comes to rest in the loading position and rotates when the fixture is given a half turn to bring the work into buffing position.

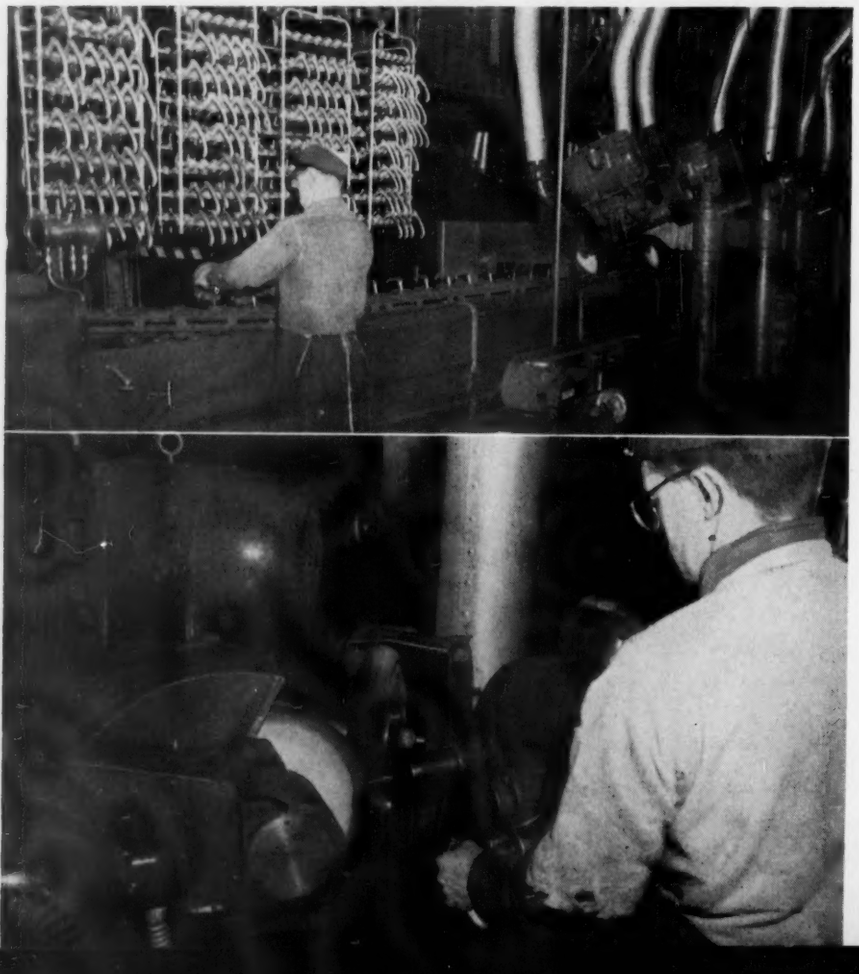
When the buckets and racks on which the die castings are carried along the grinding lines by a monorail chain conveyor reach the unloading station at the return bend in the conveyor, the castings are removed and transferred to fixtures in automatic buffing machines, some of which are in a straight-line, others rotary.

See STEEL, Nov. 14, 1938, Page 57, for description of materials handling at Ternstedt Trenton plant and STEEL, July 3, 1939, for description of production equipment.

For certain castings small inclined rotary tables with only two wheels and one operator are used. Other castings, such as trunk hinges, are buffed in machines having a larger horizontal table equipped with six buffing heads, each with its own individual motor drive. The table rotates slowly. Fixtures carry castings in succession under various wheels set at an angle to buff the various faces of the castings. One operator loads and one unloads the fixtures while a third tends the machine.

Straight-Line Buffers Used

Other castings are buffed in straight-line machines where castings, in suitable fixtures, pass under ten individual wheels. Cams are arranged to rock the fixtures to bring the castings into the positions required so all exposed surfaces are buffed. Castings are delivered to the loading operator on a conveyor and are taken from the machine at the opposite end by another operator who inspects each casting and returns it to the loading position on a belt if inadequately buffed. All automatic buffing machines use stick buffing compound



Upper, straight-line automatic buffing and coloring machine at right, unloading from conveyor to racks at left. Lower view, buffing of door handle shank and lock hole

on a counterweight holder designed to apply the compound at the required rate.

Straight-line buffing machines are equipped with quick-traversing mechanisms for returning the fixtures to the loading station after they have been unloaded. Belt and chain conveyors deliver polished castings to stations where they are racked in preparation for electroplating. Racks are hung temporarily on trees during loading. When loaded they pass on a chain conveyor through a degreaser.

One small die casting forming the sunshade pivot is ball burnished instead of being wheel polished, the working being done wet in a wood lined barrel about 30 inches inside diameter. A charge for the barrel includes 100 pounds of 5/32-inch steel balls and some 400 to 500 castings, enough to make the barrel one-third full. Solution used contains heavy-duty soap flakes and a small quantity of soda ash. Burnishing from one to three hours results in a smooth and fairly bright finish which requires no buffing prior to plating. This part is not suitable for buffing on a simple polishing machine and is not required in sufficient quantity to warrant a special polishing machine.

Two Sets of Equipment

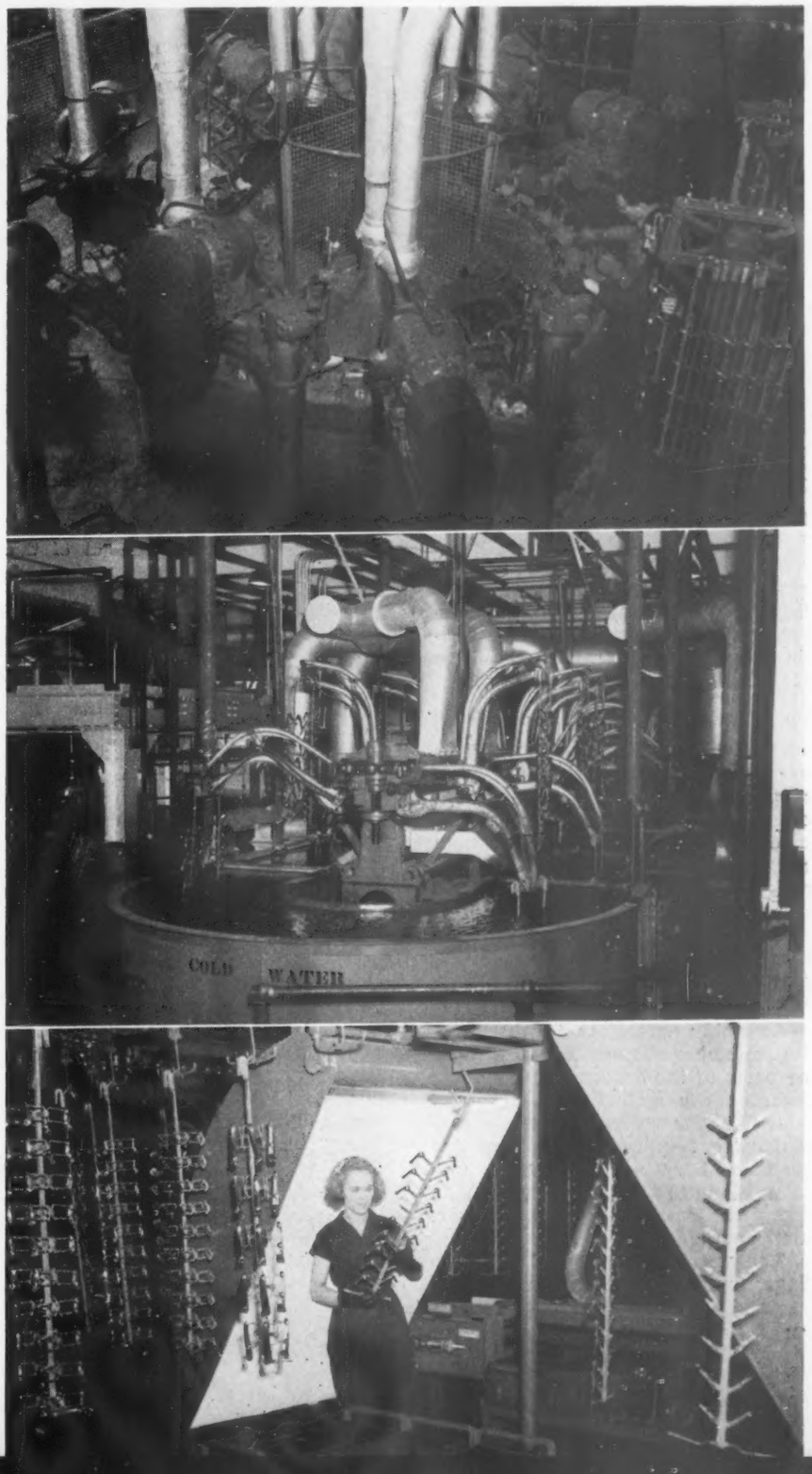
The quantity of castings handled is sufficient to require two separate sets of equipment for degreasing, cathodic and anodic alkaline cleaning, copper plating and bright nickel plating. Each set has its own chain conveyor which completes a circuit through the equipment and returns to the polishing department for reloading, each conveyor handling about half the output of the die casting department as a whole. All castings to be plated pass through circuits which are practically identical as to equipment except that those intended for outside exposure receive a heavier plate of nickel, necessitating a longer time in the nickel tank.

Before plating, all castings pass through one of the two degreasers and are subjected to both vapor and spray cleaning as well as to drying. Both degreasers include equipment for filtering and distilling the solvent. Castings require ten minutes to pass through the degreaser. Then they enter the first tank in the copper-nickel plating machine. Progress through the machine is automatic, both as to handling and timing. The time in each tank is as follows:

Cathodic electric cleaner	2 min.
Anodic electric cleaner	1 min.
Cold water rinse	30 sec.
Dip in 2 per cent acid	30 sec.
Cold water rinse	30 sec.
Cyanide copper plate	15 sec.
Cold water rinse	30 sec.
Dip in 1 per cent acid	30 sec.
Cold water rinse	30 sec.
Bright nickel plate	30 sec.
Cold water rinse	30 sec.
Hot water rinse	30 sec.

Copper bath is maintained at 130 degrees Fahr. Current density is 15 to 20 amperes per square foot, giving a copper plate, 0.0003 to 0.0005-inch thick. Nickel plating involves the use of a brightener and organic carrier which are checked daily. Here solution temperature is same but current density is 40 to 50 amperes per square foot. The pH is 2 to 2.5. The result is a bright nickel plate, 0.001 inch thick, of extreme hardness, good ductility and good adherence.

Although the nickel coating is bright and most castings do not require any buff or color of the nickel, some do—at least on certain parts. A portion of this work is done on rotary machines similar to those used for buffing before plating. Other buffing and coloring of nickel is done by hand on machines arranged along a belt on which castings are



Top, rotary automatic buffing machine for nickel coloring door handles. Direction of rotation of work is from station 8 to station 6. Center, general view of chromium plating machine. Bottom, inspection booth and special lighting arrangement

carried after removal from the nickel plating racks. This removal is done by inspectors who sort the castings into two or three different channels on the belts according to the amount of work required on the piece. Compared with gray nickel, little buffing and coloring are required. It fully justifies such extra expense and control as is required in producing a bright plate.

Racks for chromium plating are coated with vermilion stop-off lacquer to distinguish them from racks used in copper and nickel plating. The latter are covered with laminated phenolic tubing which stands up well on these racks but is not suitable for use in chrome plating. As chromium plating is a relatively short process, all the work is handled through a single machine where the following cycle is employed:

Cathodic electrolytic cleaner	1 min.
Cold water rinse	30 sec.
Dip in 1 per cent acid	20 sec.
Cold water rinse	10 sec.
Chrome plate	3¼ min.
Cold water rinse	10 sec.
Hot water rinse	10 sec.

Upon completion of this cycle, racks of castings are hung on a monorail chain which carries them to three inspection booths of sheet metal painted white inside and having concealed lamps for indirect lighting. Imperfections are seen readily. Each booth handles particular castings or groups of castings. Those which pass inspection are unloaded onto belts going to an assembly station or to shipping floor when no assembly is required. Belts which carry more than one type of casting are divided into different channels and provision is made for removing the respective types where required.

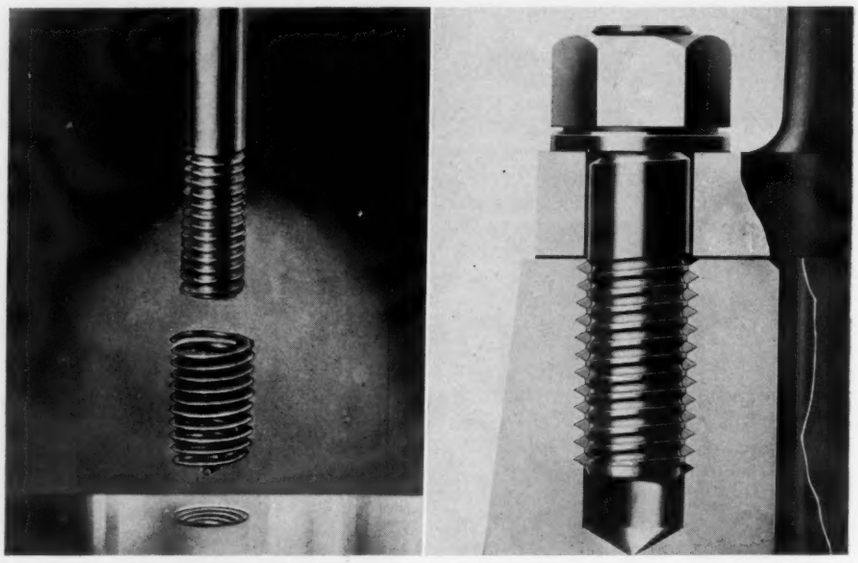
Machining Door Handles

Outside door handles with plain unmachined inserts are passed to a special machine having four heads equipped to mill two flats at the outer end and to drill and ream a hole normal to the flats and to countersink ends of the hole to receive a pawl. At another machine, the ends of pawls assembled to the handles are ground to maintain limits closer than can be assured otherwise.

Assembly operations involve staking, spinning or pressing home pins or parts of the castings, and setting locks, pawls and springs in place. Machines for several of these operations are required and others are performed by hand at various stations along the belt conveyors which bring the castings from the inspection booths.

The entire fabrication of dies castings, from weighing of raw metals to assembly proceeds in a remarkably efficient manner. In many instances, the raw material is converted into finished articles and packed for shipment in two hours or less. Other parts may require longer time but flow toward end of the production lines is continuous.

Thread System Permits Use of Cap Screws in Light Alloys



(Left) Hole is tapped with special tap, insert is screwed into the hole and stud or cap screw is screwed into the insert. (Right) Cutaway view showing how spiral insert fits between mating parts of the fastening. Note that screw bears against the bronze insert rather than against the softer metal of the alloy part

■ DEVELOPED primarily for use in the aircraft industry, a new system of screw fastenings has been devised by Air Associates Inc., Garden City, N. Y. Known as Aero-Thread, it is particularly advantageous for screws that fasten into tapped holes in light alloys such as of aluminum or magnesium.

Outstanding feature of this fastening method is the use of a spirally wound insert or bushing of precision formed, high tensile bronze spring wire. This fits into the tapped hole by screwing into the threads. Design of the insert is such that although it can be screwed readily into place, it becomes a fixed part of the tapped hole when installation is finished. When stud or cap screw is assembled, its bearing is against and in direct contact with the spiral insert, instead of against the softer metal in the light alloy part.

Thread on these new studs and cap screws is shallow and rounded, fitting a corresponding form on the inner side of the insert. Complete elimination of all sharp corners permit use of studs and screws heat-treated to high values of tensile strength, giving the fastening high shock resistance and fatigue capacity.

This system is said to simplify servicing of studs and screws. It protects threads in the female parts from wear and damage, eliminating need for oversized screws and studs or for retapping holes. Should the bronze insert become worn, it can be replaced with a new insert, and the threaded hole will be brought back to its original dimensions.

The Aero-Thread system is designed to allow unrestricted use of cap screws and removable screw fastenings in the light alloys of aluminum and magnesium. Screws of heat-treated aluminum alloy can be employed where lightness is essential. The first application of this fastening system has been in large aircraft engines where highly stressed studs, such as cylinder hold-down studs fastening into aluminum or magnesium crankcases, have presented service problems.

Aero-Thread alloy steel studs and cap screws, heat-treated to a minimum tensile strength of 150,000 pounds per square inch, are manufactured in all standard diameters and lengths. Special tools required in the application of this type of fastening include taps, inserting tool and extracting tool for the bronze inserts.

STEEL MAKING IN MINIATURE

A SPECTACULAR DIORAMA AT THE TIMKEN EXHIBIT, NEW YORK WORLD'S FAIR

We couldn't transplant the world's largest electric steel furnace (capacity, 75 tons per heat) from the Timken steel plant to the New York World's Fair, so we built a miniature reproduction of it.

Models have a fascination for everybody and while this one actually is not capable of producing steel it is perfect in proportion and detail. The miniature train seen in the lower foreground hauls the various alloys etc. needed to manufacture 100 pounds of a standard TIMKEN Alloy Steel.

Apart from the steel display however —of which the above diorama is but a part—the Timken Exhibit contains many other things which will interest and entertain you . . . from its rare beauty of design, color and lighting to the oddities of the Timken museum. The exhibit is located in the Metals Building adjacent to the Trylon and Perisphere.

★

INTERESTING HIGHLIGHTS OF THE TIMKEN EXHIBIT

A complete display of TIMKEN Seamless Steel Tubing and of cross sections of TIMKEN Alloy Steel Blooms, Billets, Bars and Rods.

One of the first automobiles to be equipped with TIMKEN Bearings.

A machine that measures the thickness of a human hair in hundred-thousandths of an inch, as a demonstration of the precision with which TIMKEN Bearings are made.

A diorama showing in miniature the world's largest electric steel furnace —capacity 75 tons of steel per heat.

A TIMKEN Fuel Injection Pump cut away to show the internal mechanism in operation.

The various parts of a TIMKEN Bearing automatically assembling and disassembling to demonstrate the tapered design and construction of the TIMKEN Bearing.

A display dramatizing the Timken Roller Bearing Company's contribution to modern locomotive design—including TIMKEN Locomotive Bearings, main rods, side rods and other reciprocating parts.

And

THE TIMKEN ROLLER SKATERS in a sensational novelty act performed on a platform only nine feet in diameter elevated seven feet above the floor. The skaters perform ten times daily.

Also be sure to see the many Timken Bearing Equipped locomotives and cars in the Railway Track Exhibit.

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THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO
Steel and Tube Division

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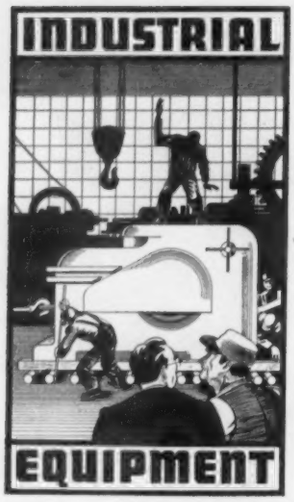
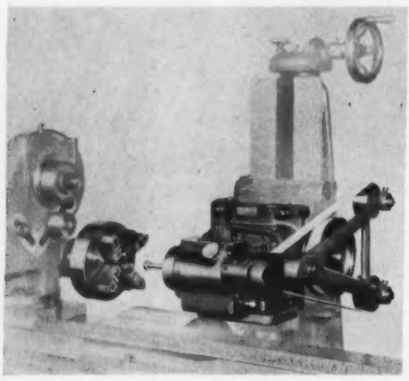


Internal Grinder

■ Brown & Sharpe Mfg. Co., Providence, R. I., has developed internal grinding attachment for its No. 13 universal and tool grinding machines. Tapered cartridge-type spindle unit is carried in body casting mounted on knee secured to front of wheel slide of machine. Spindle,



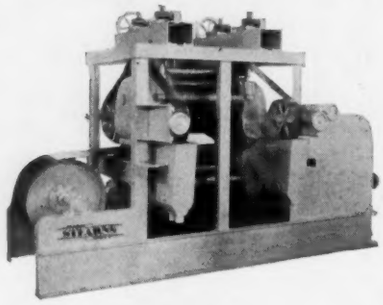
driven from machine spindle by canvas belt, runs at 27,000 revolutions per minute and is supported by two double-row self-aligning ball bearings. Oil is filtered before it reaches bearings, and after it has passed, is caught in tray which can be removed and emptied. Wheel arbors are interchangeable, and each is seated by taper and held in spindle by its threaded end. Capacity ranges from holes with minimum diameter of ¼-inch and maximum length of 1 inch to holes with minimum diameter of 7/16-inch and maximum length of 2 inches. Four-jawed chuck with jaws independent and reversible is furnished with attachment.

Bi-Post Lamp

■ Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has bi-post base lamps in 500-watt size, 250 watts less than a year ago, thus bringing to the 500-watt class more precise focusing, one plane filament, smaller size bulb that can be exposed to the weather due to use of hard glass.

Magnetic Separator

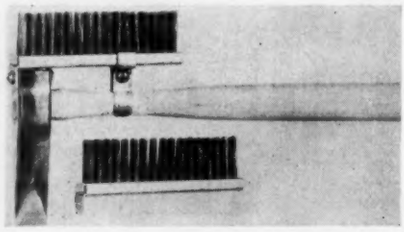
■ The Stearns Magnetic Mfg. Co., Milwaukee, Wis., announces an extensive revision of its Stearns-Wetherill type R magnetic separator. The cross belt method of magnetic separation is employed, where material is fed by a special device onto a main belt and magnetic portions intercepted and carried to special chutes on side. Units are constructed in many combinations having one or more powerful magnets



separately controlled by rheostat. Ammeters enable exact setting of magnetic force. Each gap of magnet is separately adjustable by hand-wheel control. Speed of main conveyor belt and cross belts can be regulated through variable speed motors. Hand-wheel control also is provided for slack take-up of cross belts, while take-up on main conveyor belt is through take-up bearings.

Welding Hammer-Brush

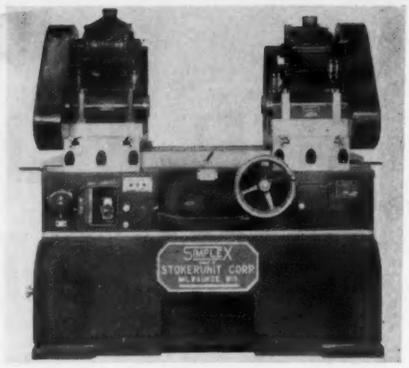
■ St. Pierre Chain Corp., Worcester, Mass., offers Triplex welders' chipper consisting of drop-forged steel chipping hammer with hardwood handle, having heavy duty



wire brush rigidly mounted on top side. Brush is held in place by bolts which can be loosened to reverse brush and get full wear from it. Unit is useful for removing rust and scale to provide clean bright surface for welding. List price is $1.50.

Precision Borer

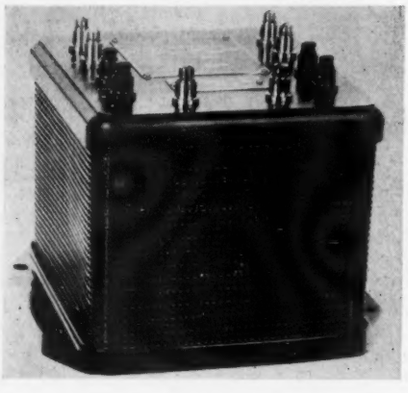
■ Stokerunit Corp., 4548 West Mitchell street, Milwaukee, has developed 200 series size of Simplex precision boring machine with added flexibility and versatility of operation. Base of machine houses electrical control panel and coolant tank and supports rubber pads on which bed proper is mounted. Pads serve to insulate machine from floor vibration. Normal spindle speed range is from 250 to 3500 revolutions per minute. Hinged guards are provided to cover all belts. Normal distance from spindle to table is 6 inches but can be increased. Table is 13 x 54¾ inches with two tee slots and centrally located alignment slot and ample coolant troughs. Solenoid operated reduction gearing provides fine feed for facing or heavy boring, and also, by means of a pneumatic time relay for each direction of feed, permits facing to a positive stop. Feeding range is 16 inches in either direction. Feeds range from 1½ to 15 inches per minute with facing feed normally 20 per cent of feed being used.



Thermal Converter

■ The Bristol Co., Waterbury, Conn., announces a thermal converter for measuring alternating current power with any potentiometer or d'Arsonval millivoltmeter. With either a direct-deflecting millivoltmeter or a potentiometer as measuring instrument, unit can be used to measure alternating-current power in individual circuit, to totalize alternating-current power in a number of circuits and to telemeter alternating-current power or totalized load.

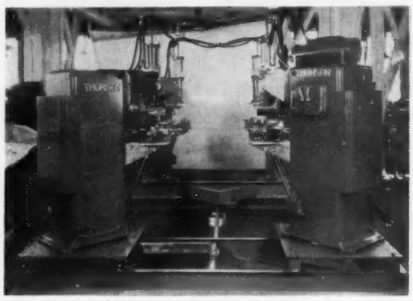
There are no make-and-break contacts, field adjustments, or moving



parts in the converter, and time of response between change of alternating-current power load and development of proportional emf in Thermoverter is less than ½-second.

Quadruple Welder

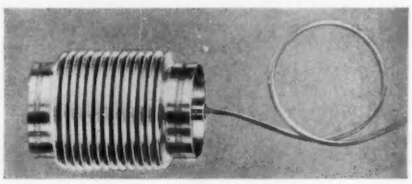
■ Thomson-Gibb Electric Welding Co., Bay City, Mich., has developed a quadruple welder accommodating structural shapes ranging from 17 x 39 inches to 41 x 63 inches. Welders at each corner operate simultaneously. Work holding and locating dies simplify work handling. Machine in right foreground of photo is anchored to base frame.



Machine in right background is mounted on a subcarriage which also supports welder in left rear and which can be moved to bring both rear welders closer to two in front. Two units at front and rear left are mounted on wheels and can be moved to close up space between welders, giving operator control over location and distance between welding points so they can be set for frames of any size or shape. Operator presses pair of push buttons to apply pressure and welding current to all four welding heads.

Circular Seam Welding

■ Chicago Metal Hose Corp., Maywood, Ill., has developed an electric resistance welder for attachment of



metal end fittings and end seals to metallic tubing. For use with stainless steel tubing and bellows, this welder permits fabrication of completely sealed vacuum tight units free from soldered, brazed or torch-welded joints. Operation is automatic and the human element is eliminated. Extremely thin gages of metal and metals of unlike thicknesses or unlike analyses can be welded easily.

Hacksaw Blades

■ E. C. Atkins & Co., Indianapolis, Ind., has developed Silver Steel hacksaw blades with improved stronger teeth. Shape of teeth produces coiled shavings similar to clock springs which eject themselves from gullet, leaving it clear for next stroke. This makes possible heavier feeds. Set allows two-way clearance—first, from point to base, and second, from front to back to

tooth, thus permitting point to cut freely, without friction. Being a twist as well as a bend, set maintains group of square-top teeth. It is essential for best results that at least three teeth be engaged in the work at all times.

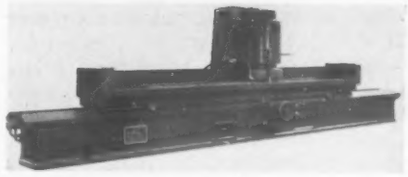
Carbon Dioxide Tester

■ Bachrach Industrial Instrument Co., 7000 Bennett street, Pittsburgh, announces Fyrite, a pocket-size carbon dioxide indicator which can make a complete analysis in less than 20 seconds. A dozen strokes of aspirator bulb fill gas chamber with flue gas to be analyzed. Sampling hose is then detached,

automatically sealing unit. To mix gas with absorption fluid, unit is turned upside down, then back to normal position, taking about 10 seconds. Suction created due to absorption of carbon dioxide pulls up absorbing fluid in graduated tube an amount equal to that of the carbon dioxide absorbed. Level then shows percentage of carbon dioxide in the gas. Indicator is made of clear tough plastic material and of balanced proportions so it is not easily upset.

Surface Grinder

■ The Hill Clutch Machine & Foundry Co., 6400 Breakwater avenue, Cleveland, has developed a vertical spindle open-side heavy-duty hydraulic surface grinder. Unit shown is size 18 x 168 inches. Vertical spindle has dynamically balanced built-in motor and carries



26-inch diameter segmental grinding wheel. Tables are 18 or 24 inches wide and from 6 to 20 feet long with hydraulic drive.

Reset Control Movement

■ The American Schaeffer & Budenberg Instrument division of Manning, Maxwell & Moore, Inc., Bridgeport, Conn., has recently designed American Micromoto reset for use in processes where widely varying load conditions have heretofore made automatic control difficult or impossible. Immediately after load change occurs, unit returns controlled temperature or pressure to controller set point as rapidly as process will permit. To prevent hunting, controllers are built with wide throttle ranges. Unit can be originally applied in Controlograph or may be added to existing control applications utilizing either American control instruments or control instruments of other makes. Some applications where instrument will improve control are: fractionating towers, heat exchangers, continuous pasteurizers, barometric condensers, desuperheaters.

Stiffness Gage

■ Taber Instrument Co., North Tonawanda, N. Y., offers the V-5 stiffness gage for thin paper and foil to .040-inch cardboard or .020-inch metal. Having a guaranteed accuracy of within ½-per cent and

sensitivity of .05 gram-centimeter in 0 to 10 gram-centimeter range, it tests a specimen 1½ x 4¼ inches. Weighing system is pendulum type and is made of aluminum alloy, keeping inertia and bearing friction to a minimum. Unit is 16 x 7½ x 6½ inches and weighs 8 pounds. List price is $125.

Free-Hand Grinder

■ Severance Tool Mfg. Co., Saginaw, Mich., is introducing a free-hand grinder for milling cutters and

similar uses. Machine enables operator to sit comfortably and magnifying lens relieves eye-strain. Spindle speeds are around 5500 to 6100 revolutions per minute. Speed changes are instantaneously made and belt tension is set by action of one binding lever. Grinding wheel is 6 inches in diameter. Table is 15 x 22 inches. Dust chute, wheel guard and pulley guards protect worker.

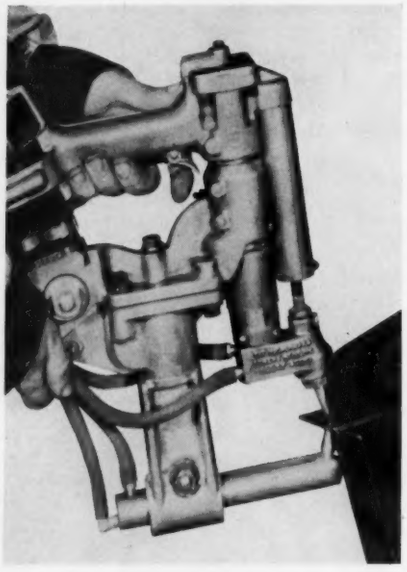
Transformer-Cooling Fan

■ Diehl Mfg. Co., Elizabethport, N. J., has portable transformer-cooling fan with water-tight motor built especially for outdoor use. Fan-blade is cast aluminum alloy and protected

with safety guard. Unit is mounted on welded structural steel frame. Usual operating position is 45 degrees above horizontal, but unit can be adjusted to any angle from horizontal to vertical. Use of this fan materially increases normal and emergency capacity of transformers. Unit weighs 150 pounds.

Pincher Welding Gun

■ Progressive Welder Co., 737 Piquette avenue, Detroit, offers hydraulic pincher-type welding gun of 50 kilovolt-ampere capacity and capable of exerting pressures to 1000 pounds. Unit is built almost entirely of magnesium and weighs but a few pounds. Sliding contact principle of current transmission is utilized. Current is transmitted to electrodes directly through pressure cylinder and piston, the latter being built into gun. Gun is cooled by two water circuits, one stream circulates through sliding contact head to one



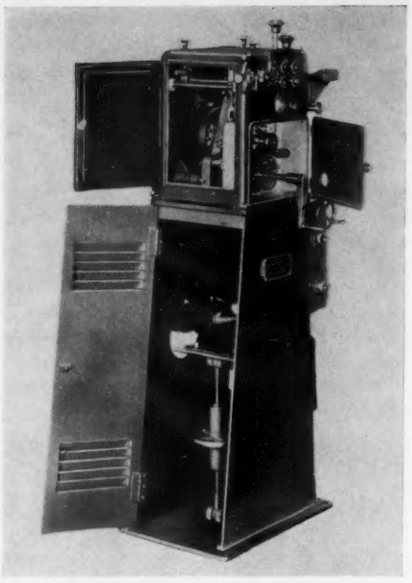
electrode, while other cools lower electrode and its welding point. Unit is available in C-type, scissors, yoke and special types.

Two-Stage Air-Cooled Portable Compressor

■ Ingersoll-Rand Co., Phillipsburg, N. J., has a line of two-stage air-cooled portable compressors. Capacities of 85, 105, 160, 210 and 315 cubic feet per minute at 100 pounds pressure are available. They are powered either by Waukesha gasoline engine or by Ingersoll-Rand Oil engine. Unit is completely streamlined.

Spring Coiler

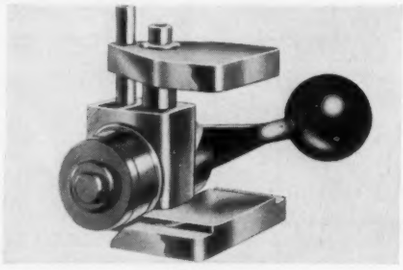
■ Sleeper & Hartley, Inc., Worcester, Mass., has developed a universal segment type spring coiler, 24-inch model, which coils and cuts all kinds of compression and extension springs from all size wire



from .004 to .028-inch diameter, inside diameter of springs being 1/32 to 11/32-inch. Wire feed may be increased from 24 to 36 inches on sizes to .02-inch.

Small-Parts Drill Jig

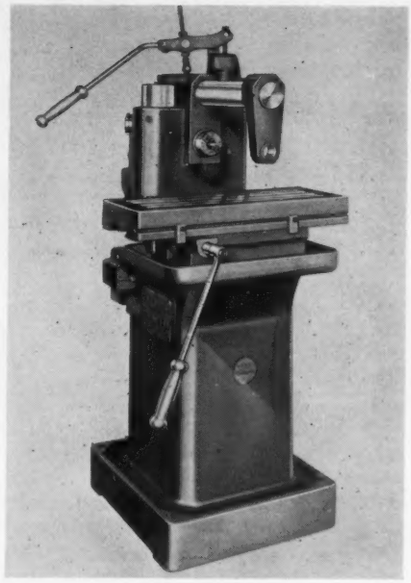
■ Esco Engineering & Sales, 4612 Woodward avenue, Detroit, has developed Mijit pump jig weighing less than six pounds and designed to meet requirements of small parts manufacturers. Working areas range from 1¼ x 2¼ inches in smallest type to 3 x 3 inches in largest. Positive lock is provided. Four distinct models are involved, incorporating a standard lift of 1 inch as well as varying locations of guide posts. Locking device can be adapted to other than four standard pump jigs. Used as a drill jig, drill bushings are placed in top plate, and work holding units are fast-



ened to under side of top plate and upper face of base plate, thus properly locating work in relation to drill bushings. Manual operation of black bakelite ball handle knob fastened on end of steel arm operates jig.

Hand Miller

■ Kent-Owens Machine Co., Toledo, O., has put on the market No. 1-M hand miller with twin post construction carrying head. Table 9 by 25 inches has T-slot on front edge, has total movement of 12 inches and is fed 4¾-inches for 180 degrees of



lever movement. Speed changes are made by pick-off gears at rear of head. Speeds of 100 to 1335 revolutions per minute are available with a 1200-revolution per-minute motor, while a maximum of 2000-revolutions per minute may be obtained with an 1800-revolution-per-minute motor. Distance from table to center of spindle ranges from 1 to 8 inches. Stroke of head feed lever moves head 4 inches.

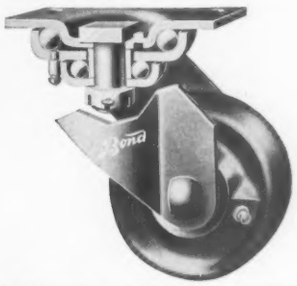
Transfer Posting Machine

■ International Business Machines Corp., 590 Madison avenue, New York, is introducing a transfer posting machine which transfers entire lines of typed or imprinted data, one at a time, from a master sheet to individual sheets or cards with

absolute accuracy and at a speed of from 500 to 1000 items an hour. Although particularly suitable for use in connection with journals and other lists of transactions prepared from punched cards on electric accounting machines, unit will also post data from master sheets prepared on electric writing machine or ordinary typewriter. Machine uses hektograph principle of duplication. Master sheet is prepared by imprinting or typing it with a sheet of hektograph carbon paper behind it. When this master sheet is positioned in machine and ledger card or other desired form is positioned to receive imprint of any desired line, a touch on finger-bar causes duplicating fluid to be applied to area immediately covering line to be printed. At same time descending bar forces liquid through paper under great pressure and transfers imprint to ledger card.

Fabricated Steel Caster

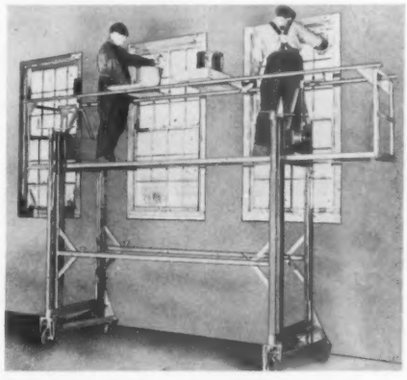
■ Bond Foundry & Machine Co., Manheim, Pa., has developed a fabricated steel caster series 40-A. Load-carrying upper ball race absorbs all side shock permitting king bolt to take vertical load only and to withstand considerable abuse. All shearing strain on the king bolt is eliminated. Lower ball race absorbs vertical load created by long throw of caster. Hardened and ground sleeve assures true surface for hardened and ground bearings with heat treated outer raceways. Pressure



lubrication is standard equipment. The 41-A stationary steel caster is designed of heavy metal as companion for swiveling model.

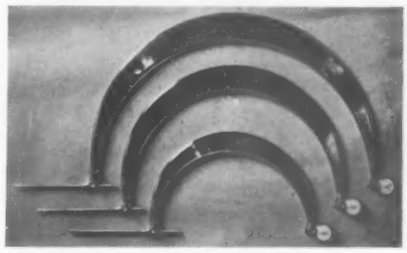
Traveling Scaffold

■ Economy Baler Co., Ann Arbor, Mich., has announced Scafol-Car, a self-elevating, self-moving traveling scaffold with a safety guard railing. Operators lift or lower themselves and move in any direction without getting down by turning cranks. Overall height in lowered position is 6 feet 5 inches and when raised, 12 feet 2 inches. Height of platform in lowered position is 1 foot 6½ inches and when raised, 9 feet 3⅝ inches. Distance between upright ends close coupled is 5 feet and when fully extended, 8 feet. Length of standard working platform is 10 feet. Elevation speed is 2 feet per minute and lowering speed is 4 feet per minute. Traveling speed is 30 feet per minute. Load capacity is 1500 pounds. Unit collapses for storage into 16 cubic feet.



Micrometer Indicator

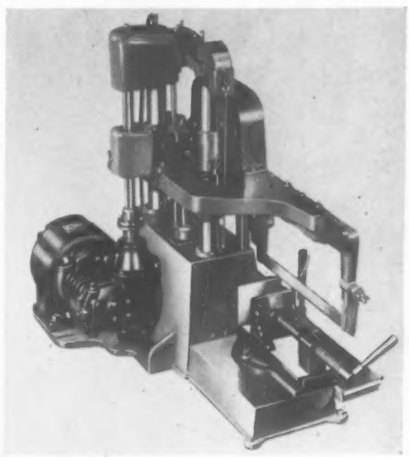
■ Davis & Thompson Co., 6619 West Mitchell street, Milwaukee, has developed dial indicators for use on tubular micrometers from 6 to 96-inch sizes enabling user to obtain accurate measurements within 0.0005-inch. Indicator accuracy is thus not



so dependent on human element, and greater efficiency is assured.

Precision Power Saw

■ Comstock-Staplin, Inc., 20 North Wacker drive, Chicago, announces portable, angle-cutting, Master precision power saw with hydraulic movement causing saw blade to clear the cut 1/16-inch on return stroke. Chip interference is impossible because blade comes into work from cam action and forward

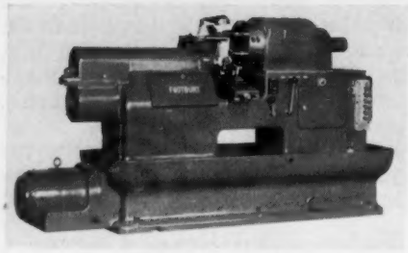


teeth take out all chips before full blade reaches work. Machine is set for 6¾-inch stroke, and although very high speed of operation is maintained, saw blade will not overheat. Actual capacity is 7 x 7 inches, and capacity with swivel vise at 45 degrees, 5 x 5 inches. Blade is 17 inches long. Saw makes 108 strokes per minute.

Screw Machine

■ The Foote-Burt Co., 13000 St. Clair avenue, Cleveland, has developed No. 1½ Footburt automatic single

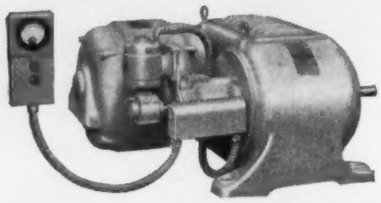
spindle screw machine with normal capacity of 1½ inches. By use of solid chuck and shell it will take 1⅝ inches. Unit is efficient down to ½-inch due to wide range of speeds, and will machine pieces up to 14 inches long. Spindle is equipped with chucking device consisting of roller arrangement working under spring compression which eliminates usual fingers and is much more positive. Turret is provided with six holes, is built to withstand heavy feeds and is indexed by Geneva motion. Feed is accomplished by means of hydraulically-



driven drum-type cam having a solid path. Control panel has six micrometer type knobs for controlling hydraulic valves, one for each hole of turret. Length of the slow feed is adjusted by location of trip dogs on revolving disk plate. Extra attachments can be furnished.

Remote Speed Indicator

■ U. S. Electrical Motors Inc., 200 East Slauson avenue, Los Angeles, has developed electric remote speed indicator for its Varidrive motor providing accurate and simple means of



selecting operating speed from a remote point. Device is a simply constructed meter used as an indicator and mounted in a compact box with push button for controlling electric pilot motor that changes speed. Indicator is calibrated in divisions 1 to 10. When high or low button is pushed speed is immediately changed, and change registers on indicator.

Monoxide Indicator

■ Mine Safety Appliances Co., Braddock, Thomas and Meade streets, Pittsburgh, has a portable hand-operated carbon monoxide indicator sensitive to concentrations as low as a few thousandths of one per cent. Small four-cylinder radial hand-operated pump develops suction for sampling with little effort on operator's part. Built-in pressure regulator automatically main-

tains correct sample flow, indicated on diaphragm-type pressure gage. Percentage of carbon monoxide is indicated on direct-reading calibrated meter having scale range from 0 to 0.15 per cent carbon monoxide. Meter can be read directly to 0.005 per cent and readings estimated to 0.001 per cent (one part in 100,000).

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Conveyorized

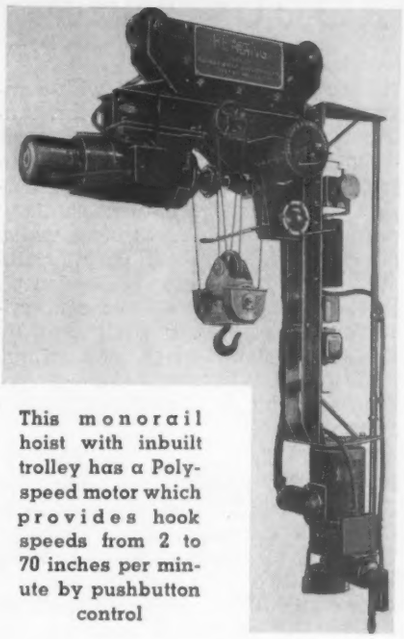
(*Concluded from Page* 54)

chain at this point, but travel around the circuit back to the two spray booths seen at the extreme upper section of this conveyor in Fig. 2. Here they are given a second coat and hung back on the conveyor chain, indicated by arrows on Fig. 2.

After passing again through drier unit and continuous furnace, parts taken from the chain at the unloading station alongside the furnace, inspected and either placed in a bank or put on a belt conveyor carrying them to stock bins on the second floor. Total length of main chain conveyor for the continuous furnace is 550 feet.

Since temperature and time required to fuse the enamel coatings vary according to type of material and coating, the speed of this main chain conveyor is set at 18 to 20 inches per minute when handling cast iron parts. This is adjusted to from 7 to 9 feet per minute when fusing ground coat on sheet steel parts. Speed of 10 to 12 feet per minute is employed when fusing cover coats on sheet steel.

Such completely conveyorized handling equipment not only assures maximum production but helps maintain perfect co-ordination and smooth running of all departments. By means of the equipment described above, this plant, occupying 30,000 square feet, is able to turn out 5000 square feet of porcelain enameled sheet steel and 20,000 to 30,000 pounds of cast iron per day, all of the highest quality.



This monorail hoist with inbuilt trolley has a Polyspeed motor which provides hook speeds from 2 to 70 inches per minute by pushbutton control

Hoist Speed Range 35:1

■ In the manufacture of tin foil it is very important when pouring the metal alloy from ladle to mold that there be no ripples or bubbles on surface of metal when it reaches mold. In order to achieve this result the mold has to be lowered exactly six inches a minute. To save time in raising, mold should travel at least sixty inches a minute. Confronted with this problem, Reynolds Metal Co., Richmond, Va., turned to Reading Chain & Block Corp., Reading, Pa., which built a hoist using a field weakening direct current motor with a 10:1 speed range. Field control over this wide range proved unsuccessful and another method of speed control had to be devised. Reading Chain & Block Corp. then consulted engineers of the Crocker Wheeler Electric Mfg. Co., Ampere, N. J., which recommended an alternating current Polyspeed motor with a preset control head.

This motor is similar to an ordinary induction motor except that the rotor winding is brought out to a commutator and connected through brushes to an induction regulator which applies proper voltages to the rotor for getting the various motor speeds. This applied voltage bucks generated rotor voltage for speeds below synchronism and aids rotor voltage for speeds above synchronism. The preset head consists of an auxiliary pilot motor rotating induction regulator through reducing gears, with a number of preselected stops. Pushbutton control of pilot motor makes it possible to go up to ten predetermined speeds. A 10:1 worm gear is used to aid in getting low speed.

Hoist has a double-drum for cables, a built-in trolley, is rated 3 tons and runs on a monorail beam. The mold it handles weighs 6000 pounds and the molten metal 1000 pounds. The Polyspeed motor is rated 2 horsepower and, with present arrangement, can lower mold as slowly as two inches per minute and raise it at seventy inches per minute. Pilot motor on regulator is stopped by plugging and a stop mechanism which prevents reversal. Polyspeed motor is stopped by a magnetic brake.

♦

One-Piece Copper Rotor For Induction Motors

■ A one-piece centrifugally cast Copperspun rotor has been developed by Fairbanks, Morse & Co., 600 South Michigan avenue, Chicago. In this process, copper is poured into a mold encasing the punched laminations which are stacked and held under pressure. Copper is poured at top of mold while entire assembly is spun at high speed, the short circuiting end ring on the bottom being formed by material that has passed through the rotor slots. As a result of centrifugal force, a tough, dense, ductile copper winding is produced with high strength, full slots and uniform structure and conductivity.

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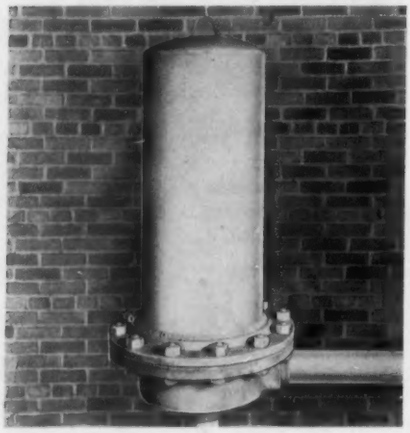
Locked Coil
Regular Lay
Lang's Lay
Hemp Center
Wire Rope Center
Metallic Core
Seale - Filler Wire
Warrington

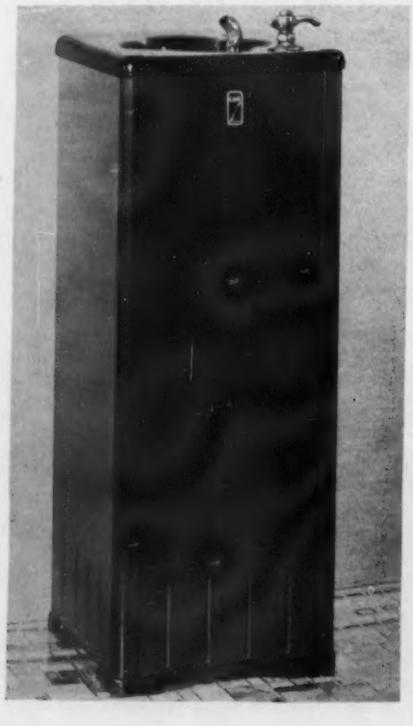
NEW METAL PRODUCTS

■ An odor adsorber for removing all types of odors such as oil vapors, fermentation vapors and other gases from compressed air lines has been announced by W. B. Connor Engineering Corp., Dorex Air Conditioning division, 114 East



Thirty-second street, New York. Unit is an auxiliary air stream filter of activated coconut shell carbon which is one of the most active commercial adsorption agents known. Carbon will adsorb odors up to 15 to 20 per cent of its own weight. Unit shown has a compressed air capacity of 175 cubic feet per minute.

■ Electric water coolers built in bottle and bubbler types are announced by Cordley & Hayes, 145 Hudson street, New York. Coolers occupy 15½ inches of floor space due to double deck design of self-

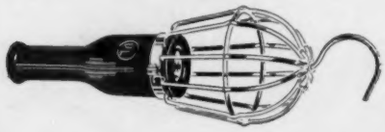


contained condensing unit with compressor mounted above motor. Automatic control maintains correct temperature of water to suit occupation of workers. Coolers for bottled water have permanent sanitary and rust-proof stainless steel water cooling container. Integral stainless steel tube extends to faucet. Bubbler type coolers have contamination-proof bubbler design. Cabinets are finished in grained walnut and metallic bronze. Coolers are approved by Underwriters laboratories.

■ A streamlined spray gun for light work is offered by Binks Mfg. Co., 3114 Carroll avenue, Chicago. Gun has interchangeable nozzles, low pressure drop and low air consumption. Control for amount of material is placed at back of gun while control of spray width, is by

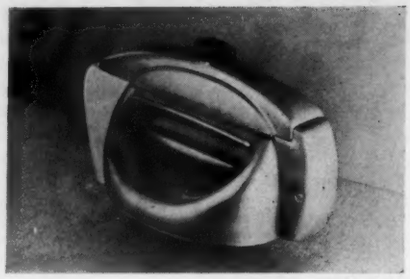
a knurled screw back of one-piece nozzle head.

■ A lamp guard that will not roll when laid down has been introduced by McGill Mfg. Co., Valparaiso, Ind. Portable guard, No. 7060, is designed especially to accommodate



smaller sizes of lamps, 25 to 60 watts. Cage of guard is constructed of ten extra-heavy steel wires, electrially welded and cadmium plated. Fiber disk seated inside handle takes all strain off cord and socket connection.

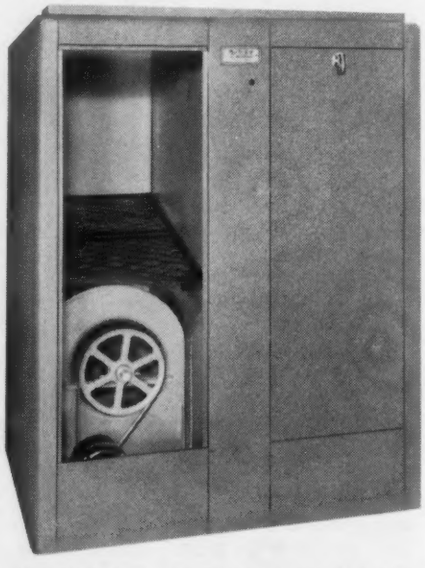
■ Streamlined domestic wringers designed by Designers for Industry, Inc., Terminal Tower, Cleveland for Lovell Mfg. Co., Erie, Pa. create an effect of sturdy massiveness. New type push-pull safety release bar, safety release mechanism and protected feeding zone give greater protection to operator. Die cast aluminum feeding shelves are formed



to permit rapid return of water. Water guards integral with frame guide flow of water.

■ A combustion regulator designed to hold steam pressure in gas-fired boilers within close limits and to control air supply to burner in conjunction with gas has been developed by Minneapolis-Honeywell Regulator Co., Minneapolis. Regulator can be installed to automatically fire any radiant or blue-flame burner of atmospheric type. Control is mounted on gas valve bonnet at single point. Installation has a ¼-inch steam supply and exhaust line and connection to electric service. Any interruption of electrical safety circuit by lo-water cutoff, pilotstat or flame relay will cause shutdown of gas valve.

■ Rudy Furnace Co., Dowagiac, Mich., has placed on the market an all-automatic, thermostat controlled, Rudico Gas-Heat air conditioner for homes. Air is heated, humidified and circulated by a positive pressure blower. A spun glass filter impregnated with an odorless gum removes solid particles from the air. Wick-type humidifier supplies moisture automatically. Motor pulleys are



adjustable to give wide range of fan speeds and balancing of air speeds after installation if necessary. The air cycle is repeated many times daily.

ADVERTISING PAGES REMOVED

Pickup In Market Activity Extended

Most Of Holiday Loss Recovered; Auto Demand Lags

MARKET IN TABLOID ★

Demand
Tending upward; miscellaneous users best buyers.

Prices
Generally steadier; scrap stronger in leading districts.

Production
Up 8½ points to 50½ per cent; still below June peak.

■ FINISHED steel demand and ingot production have recovered further from the early-July slump, but divergent trends in consumption will temper the additional improvement indicated for the next several weeks.

Steelmaking last week rose 8½ points to 50½ per cent. This is 4 points below the pre-holiday average but is well above the 32 per cent rate a year ago. Higher schedules are forecast for several districts this week, and prospects are favorable for recovery of all the holiday drop before the end of July.

Steel buying has improved materially the past ten days, in some instances exceeding the June weekly average. Miscellaneous consumers predominate such gains. Offsetting this upturn is the lag in automotive requirements, part of which is attributed to effects of the tool and die workers' strike. Major influence is the fact auto companies either have closed for the changeover to new models or are nearing final runs of current models and are tapering operations. However, some partsmakers have held up steel shipments because the labor situation has delayed preparatory work on 1940 model production.

Auto Labor Situation To Affect Steel Deliveries

Extent of this delay will be an important factor in regulating steel shipments the next 60 days. Most opinion is that an early settlement of the strike will be reached and that automotive steel needs will become increasingly heavier after mid-August.

Motorcar assemblies rebounded as expected last week to 61,610 units, a gain of 18,826 but nearly 10,000 units below the total for the last week of June. Ford had the largest recovery, from 10,800 to 18,500, with General Motors rising from 13,775 to 18,425, Chrysler from 13,980 to 18,320 and all others from 4229 to 6365.

Farm equipment builders in the Chicago area again are in production after recent shutdowns and will provide stronger support to steel demand. New small tractors appear likely to become an increasingly important part of agricultural machinery output in the near future.

Continued quiet in railroad equipment orders and a tapering in structural shape and concrete reinforcing bar inquiries detract somewhat from the favorable situation created by gains in miscellaneous steel demand. Rail production is declining seasonally, and few freight car inquiries are active. While there are intimations recent and prospective improvement in freight traffic presages expansion in repair and building programs, many carriers appear disposed to postpone such work for the present, or at least until a larger upturn in earnings is an actual fact.

Bids On Battleship Steel Disclose Stronger Prices

Good activity continues among eastern shipyards. Opening of bids by the navy last week on material for two battleships disclosed firmer prices on steel plates. Most of the tonnage was bid at full published prices, with small concessions offered on several lots. Steel quotations generally are steadier, although not rigid, better stability extending even to some of the weakest products.

Tin plate production, at 60 per cent, has recovered only one-half the holiday week loss. A gradual letdown in specifications during the remainder of the canning season is indicated.

Pig iron shipments are back to the June daily average, following a sharp drop the first ten days this month, when many foundries were closed. New business in some districts is heavier than a month ago.

Quickening in scrap markets and stronger prices lend support to expectations of further gains in steel demand and production. Higher scrap quotations are forecast shortly in some districts. The composite advanced 21 cents last week to $14.75 on an upturn at Chicago and Pittsburgh.

Except for a 7-point drop at Cincinnati, all steelmaking areas reported higher schedules last week. Gains included 8 points to 44 per cent at Pittsburgh, 5½ points to 50 at Chicago, 8 points to 40 in eastern Pennsylvania, 15 points to 53 at Youngstown, 17 points to 79 at Wheeling, 15½ points to 43 at Cleveland, 4½ points to 37 at Buffalo, 15 points to 80 at Birmingham, 8 points to 40 in New England, 14 points to 45 at St. Louis and 8 points to 64 at Detroit.

COMPOSITE MARKET AVERAGES

	July 15	July 8	July 1	One Month Ago June, 1939	Three Months Ago April, 1939	One Year Ago July, 1938	Five Years Ago July, 1934
Iron and Steel	$35.85	$35.81	$35.72	$35.69	$36.34	$36.32	$32.32
Finished Steel	55.60	55.60	55.70	55.70	56.50	57.20	54.05
Steelworks Scrap..	14.75	14.54	14.54	14.49	14.98	13.06	10.30

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	July 15, 1939	June, 1939	April, 1939	July, 1938
Steel bars, Pittsburgh	2.15c	2.15c	2.25c	2.25c
Steel bars, Chicago	2.15	2.15	2.25	2.25
Steel bars, Philadelphia	2.47	2.47	2.57	2.57
Iron bars, Terre Haute, Ind.	2.05	2.05	2.15	2.15
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.215	2.215	2.215
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.15	2.15	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.00	2.00	2.15	2.15
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.20	3.20
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.00	2.00	2.15	2.15
Sheets, cold-rolled, Gary	3.05	3.05	3.20	3.20
Sheets, No. 24 galv., Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.60
Tin plate, per base box, Pitts.	$5.00	$5.00	$5.00	$5.35
Wire nails, Pittsburgh	2.45	2.45	2.45	2.45

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods, No. 5 to $\frac{9}{32}$-inch, Pitts.	43.00	43.00	43.00	43.00

Pig Iron

	July 15, 1939	June, 1939	April, 1939	July, 1938
Bessemer, del. Pittsburgh	$22.34	$22.34	$22.34	$21.34
Basic, Valley	20.50	20.50	20.50	19.50
Basic, eastern, del. Philadelphia	22.34	22.34	22.34	21.34
No. 2, foundry, Pittsburgh	22.21	22.21	22.21	21.21
No. 2, foundry, Chicago	21.00	21.00	21.00	20.00
Southern No. 2, Birmingham	17.38	17.38	17.38	16.38
Southern No. 2, del. Cincinnati	20.89	20.89	20.89	19.89
No. 2X, del. Phila. (differ. av.)	23.215	23.215	23.215	22.215
Malleable, Valley	21.00	21.00	21.00	20.00
Malleable, Chicago	21.00	21.00	21.00	20.00
Lake Sup., charcoal, del. Chicago	28.34	28.34	28.34	28.34
Gray forge, del. Pittsburgh	21.17	21.17	21.17	20.17
Ferromanganese,del. Pittsburgh	85.33	85.33	85.33	97.77

Scrap

Heavy melting steel, Pittsburgh	$15.75	$15.00	$15.50	$13.75
Heavy melt. steel, No. 2, E. Pa	13.75	13.125	13.65	12.20
Heavy melting steel, Chicago	13.50	13.40	13.35	12.05
Rails for rolling, Chicago	17.75	17.65	17.25	17.05
Railroad steel specialties, Chicago	15.50	15.30	15.35	14.95

Coke

Connellsville, furnace, ovens	$3.75	$3.75	$3.75	$3.75
Connellsville, foundry, ovens	5.00	5.00	5.00	5.00
Chicago, by-product fdry., del.	10.50	10.50	10.50	10.80

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. cars.

Sheet Steel

Hot Rolled

Pittsburgh	2.00c
Chicago, Gary	2.00c
Cleveland	2.00c
Detroit, del.	2.00c
Buffalo	2.00c
Sparrows Point, Md.	2.00c
New York, del.	2.24c
Philadelphia, del.	2.17c
Granite City, Ill.	2.10c
Middletown, O.	2.00c
Youngstown, O.	2.00c
Birmingham	2.00c
Pacific Coast points	2.50c

Cold Rolled

Pittsburgh	3.05c
Chicago, Gary	3.05c
Buffalo	3.05c
Cleveland	3.05c
Detroit, delivered	3.15c
Philadelphia, del.	3.37c
New York, del.	3.39c
Granite City, Ill.	3.15c
Middletown, O.	3.05c
Youngstown, O.	3.05c
Pacific Coast points	3.65c

Galvanized No. 24

Pittsburgh	3.50c
Chicago, Gary	3.50c
Buffalo	3.50c
Sparrows Point, Md.	3.50c
Philadelphia, del.	3.67c
New York, delivered	3.74c
Birmingham	3.50c
Granite City, Ill.	3.60c
Middletown, O.	3.50c
Youngstown, O.	3.50c
Pacific Coast points	4.00c

Black Plate, No. 29 and Lighter

Pittsburgh	3.05c
Chicago, Gary	3.05c
Granite City, Ill.	3.15c

Long Ternes No. 24 Unassorted

Pittsburgh, Gary	3.80c
Pacific Coast	4.50c

Enameling Sheets

	No. 10	No. 20
Pittsburgh	2.75c	3.35c
Chicago, Gary	2.75c	3.35c
Granite City, Ill.	2.85c	3.45c
Youngstown, O.	2.75c	3.35c
Cleveland	2.75c	3.35c
Middletown, O.	2.75c	3.35c
Pacific Coast	3.35c	3.95c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	24.00	25.00
Plates	27.00	29.00
Sheets	34.00	36.00
Hot strip	21.50	23.50
Cold strip	28.00	30.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	18.50	19.00	22.50	27.50
Plates	21.50	22.00	25.50	30.50
Sheets	26.50	29.00	32.50	36.50
Hot strip	17.00	17.50	24.00	35.00
Cold stp.	22.00	22.50	32.00	52.00

Steel Plate

Pittsburgh	2.10c
New York, del.	2.19-2.29c
Philadelphia, del.	2.15c
Boston, delivered	2.42c
Buffalo, delivered	2.33c
Chicago or Gary	2.10c
Cleveland	2.10c
Birmingham	2.10c
Coatesville, base	2.10c
Sparrows Point, base	2.10c
Claymont, del.	2.10c
Youngstown	2.10c
Gulf ports	2.45c
Pacific Coast points	2.60c

Steel Floor Plates

Chicago	3.35c
Gulf ports	3.70c
Pacific Coast ports	3.95c
Pittsburgh	3.35c

Standard Shapes

Pittsburgh	2.10c
Philadelphia, del.	2.21½c
New York, del.	2.27c
Boston, delivered	2.41c
Bethlehem	2.10c
Chicago	2.10c
Cleveland, del.	2.30c
Buffalo	2.10c
Gulf ports	2.45c
Birmingham	2.10c
St. Louis, del.	2.34c
Pacific Coast points	2.70c

Tin and Terne Plate

Tin Plate, Coke (base box)

Pittsburgh, Gary, Chicago	$5.00
Granite City, Ill.	5.10

Mfg. Terne Plate (base box)

Pittsburgh, Gary, Chicago	$4.30
Granite City, Ill.	4.40

Bars

Soft Steel

(Base, 3 tons or over)

Pittsburgh	2.15c
Chicago or Gary	2.15c
Duluth	2.25c
Birmingham	2.15c
Cleveland	2.15c
Buffalo	2.15c
Detroit, delivered	2.25c
Philadelphia, del.	2.47c
Boston, delivered	2.52c
New York, del.	2.49c
Gulf ports	2.50c
Pacific Coast points	2.75c

Rail Steel

(Base, 15 tons or over)

Pittsburgh	2.00c
Chicago or Gary	2.00c
Detroit, delivered	2.10c
Cleveland	2.00c

Buffalo	2.00c
Birmingham	2.00c
Gulf ports	2.35c
Pacific Coast points	2.60c

Iron

Chicago, Terre Haute	2.05c
Philadelphia	2.37c
Pittsburgh, refined	3.50-8.00c

Reinforcing

New billet, straight lengths, quoted by distributors

Chicago, Gary, Buffalo Cleve., Birm., Young., Sparrows Pt., Pitts.	1.80-2.05c
Detroit, delivered	1.90-2.15c
Gulf ports	2.20-2.40c
Pacific coast ports	2.50c
Philadelphia, del.	1.97-2.22c

Rail steel, straight lengths, quoted by distributors

Pittsburgh, Gary, Chicago, Buffalo, Cleveland, Birm.	1.75-1.90c
Detroit, delivered	1.85-2.00c
Gulf ports	2.10-2.25c
Pacific Coast	2.35c

Wire Products

Pitts.-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads

Standard wire nails	$2.40
Cement coated nails	$2.40

(Per pound)

Polished staples	3.10c
Galv. fence staples	3.35c
Galv. barbed wire, standard 12½ gage two-point hog, 80-rod spool $2.74; two-point cattle, 80-rod spool	$2.58
Annealed fence wire	2.90c
Galv. fence wire	3.30c
Woven wire fencing (base C. L. column)	67.00
Single loop bale ties, (base C. L. column)	56.00

To Manufacturing Trade

Base, Pitts. - Cleve. - Chicago-Birmingham (except spring wire)

Bright bess., basic wire	2.60c
Galvanized wire	2.65c
Spring wire	3.20c

Worcester, Mass., $2 higher on bright basic and spring wire.

Cut Nails

Carloads, Pittsburgh $3.60

Cold-Finished Bars

	Carbon	Alloy
Pittsburgh	2.65c	3.35c
Chicago	2.65c	3.35c
Gary, Ind.	2.65c	3.35c
Detroit	2.70c	*3.45c
Cleveland	2.65c	3.35c
Buffalo	2.65c	3.35c

*Delivered.

Alloy Bars (Hot)

(*Base, 3 tons or over*)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem	2.70c
Detroit, delivered	2.80c

Alloy	S.A.E.	Alloy
S.A.E. Diff.		Diff.
2000 0.35	3100	0.70
2100 0.75	3200	1.35
2300 1.55	3300	3.80
2500 2.25	3400	3.20
4100 0.15 to 0.25 Mo.		0.55
4600 0.20 to 0.30 Mo. 1.50-2.00 Ni.		1.10
5100 0.80-1.10 Cr.		0.45
5100 Cr. spring flats		0.15
6100 bars		1.20
6100 spring flats		0.85
Cr. N., Van.		1.50
Carbon Van.		0.85
9200 spring flats		0.15
9200 spring rounds, squares		0.40

Electric furnace up 50 cents.

Strip and Hoops

(*Base, hot strip, 1 ton or over; cold, 3 tons or over*)

Hot Strip, 12-inch and less

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, Birmingham	2.00c
Detroit, del.	2.10c
Philadelphia, del.	2.32c
New York, del.	2.36c
Cooperage hoop, Youngs., Pitts.; Chicago, Birm.	2.10c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland, Youngstown	2.80c
Chicago	2.90c
Detroit, del.	2.90c
Worcester, Mass.	3.00c

Carbon	Cleve., Pitts.
0.26—0.50	2.80c
0.51—0.75	4.30c
0.76—1.00	6.15c
Over 1.00	8.35c

Worcester, Mass $4 higher.

Commodity Cold-Rolled Strip

Pitts.-Cleve.-Youngstown	2.95c
Detroit, del.	3.05c
Worcester, Mass.	3.35c

Lamp stock up 10 cents.

Rails, Fastenings

(*Gross Tons*)

Standard rails, mill	$40.00
Relay rails, Pittsburgh 20—100 lbs.	32.50-35.50
Light rails, billet qual., Pitts., Chicago, B'ham.	$40.00
Do., rerolling quality	39.00

Cents per pound

Angle bars, billet, mills	2.70c
Do., axle steel	2.35c
Spikes, R. R. base	3.00c
Track bolts, base	4.15c
Car axles forged, Pitts., Chicago, Birmingham	3.15c
Tie plates, base	2.15c

Base, light rails 25 to 60 lbs., 20 lbs., up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade as per Dec. 1, 1932, lists, carloads 5% up; full containers additional 10%.

Carriage and Machine

½ x 6 and smaller	68.5 off
Do. larger, to 1-in.	66 off
Do. 1⅛ and larger	64 off
Tire bolts	52.5 off

Stove Bolts

In packages with nuts attached 72.5 off; in packages with nuts separate 72.5-12½ off; bulk 84 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Step bolts	60 off
Elevator bolts	60 off
Plow bolts	68.5 off

Nuts

Semifinished hex.	U.S.S.	S.A.E.
6-inch and less	67	70
⅞—1-inch	64	65
1⅛ and larger	62	62

Hexagon Cap Screws

Upset, 1-in., smaller	67.5 off

Square Head Set Screws

Upset, 1-in., smaller	75.0 off
Headless set screws	70.0 off

Piling

Pitts., Chgo., Buffalo	2.40c
Gulf ports	2.75c

Rivets, Washers

Structural, Pittsburgh, Cleveland, Chicago	3.40c
⅞-inch and smaller, 11 and 12	63½ 54
Pitts., Chi., Cleve.	65-10 off
Wrought washers, Pitts., Chi., Phila., to jobbers and large nut, bolt mfrs. l.c.l. $5.40; c.l. $5.75 off	

Welded Iron, Steel Pipe

Base discounts on steel pipe. Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Chicago delivery 2½ and 1½ less, respectively. Wrought pipe, Pittsburgh base.

Butt Weld

Steel

In.	Blk.	Galv.
⅛	63½	54
¼	66½	58
1—3	68½	60½

Iron

¼	30	13
1—1¼	34	19
1½	38	21½
2	37½	21

Lap Weld

Steel

2	61	52½
2½—3	64	55½
3½—6	66	57½
7 and 8	65	55½
9 and 10	64½	55

Iron

2	30½	15
2½—3½	31½	17½
4	33½	21
4½—8	32½	20
9—12	28½	15

Line Pipe

Steel

1 to 3, butt weld	67½	
2, lap weld	60	
2½ to 3, lap weld	63	
3½ to 6, lap weld	65	
7 and 8, lap weld	64	
10-inch lap weld	63½	
12-inch, lap weld	62½	

Iron

	Blk.	Galv.
⅜ butt weld	25	7
1 and 1¼ butt weld	29	13
1½ butt weld	33	15½
2 butt weld	32½	15
1½ lap weld	23½	7
2 lap weld	25½	9
2½ to 3½ lap weld	26½	11½
4 lap weld	28½	15
4½ to 8 lap weld	27½	14
9 to 12 lap weld	23½	9

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut lengths 4 to 24 feet; f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Welded

Sizes	Gage	Steel	Charcoal Iron
1½" O. D.	13	$ 9.72	$23.71
1¾" O. D.	13	11.06	22.93
2" O. D.	13	12.38	19.35
2¼" O. D.	13	13.79	21.68
2¼" O. D.	12	15.16	.....
2½" O. D.	12	16.58	26.57
2¾" O. D.	12	17.54	29.00
3" O. D.	12	18.35	31.36
3½" O. D.	11	23.15	39.81
4" O. D.	10	28.66	49.90
5" O. D.	9	44.25	73.93
6" O. D.	7	68.14	.....

Seamless

Sizes	Gage	Hot Rolled	Cold Drawn
1" O. D.	13	$ 7.82	$ 9.01
1¼" O. D.	13	9.26	10.67
1½" O. D.	13	10.23	11.79
1¾" O. D.	13	11.64	13.42
2" O. D.	13	13.04	15.03
2¼" O. D.	13	14.54	16.76
2½" O. D.	12	16.01	18.45
2½" O. D.	12	17.54	20.21
2¾" O. D.	12	18.59	21.42
3" O. D.	12	19.50	22.48
3½" O. D.	11	24.62	28.37
4" O. D.	10	30.54	35.20
4½" O. D.	10	37.35	43.04
5" O. D.	9	46.87	54.01
6" O. D.	7	71.96	82.93

Cast Iron Pipe

Class B Pipe—Per Net Ton

6-in., & over, Birm.	$42.00-43.00
4-in., Birmingham	45.00-46.00
4-in., Chicago	53.80-54.80
6-in. & over, Chicago	50.80-51.80
6-in. & over, east fdy.	46.00
Do., 4-in.	49.00

Class A Pipe $3 over Class B
Stnd. fitgs., Birm., base $100.00

Semifinished Steel

Rerolling Billets, Slabs

(*Gross Tons*)

Pittsburgh, Chicago, Gary, Cleve., Buffalo, Young., Birm., Sparrows Point	$34.00
Duluth (billets)	36.00
Detroit, delivered	36.00

Forging Quality Billets

Pitts., Chi., Gary, Cleve., Young., Buffalo, Birm.	40.00
Duluth	42.00

Sheet Bars

Pitts., Cleveland, Young., Sparrows Point, Buffalo, Canton, Chicago	34.00
Detroit, delivered	36.00

Wire Rods

Pitts., Cleveland, Chicago, Birmingham No. 5 to ⅜-inch incl.	43.00
Do., over ⅜ to 41/64-in. incl.	48.00

Worcester up $2; Galveston up $6; Pacific Coast up $9.

Skelp

Pitts., Chi., Young., Buff., Coatesville, Sparrows Pt.	1.90c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$3.75
Connellsville, fdry.	4.75- 5.50
Connell. prem. fdry.	5.75- 6.25
New River fdry.	6.50- 6.75
Wise county fdry.	5.50- 5.75
Wise county fur.	4.50- 4.75

By-Product Foundry

Newark, N. J., del.	10.88-11.35
Chi., ov., outside del.	9.75
Chicago, del.	10.50
Terre Haute, del.	10.00
Milwaukee, ovens	10.50
New England, del.	12.50
St. Louis, del.	11.00-11.50
Birmingham, ovens	7.00
Indianapolis, del.	10.00
Cincinnati, del.	9.75
Cleveland, del.	10.30
Buffalo, del.	10.50
Detroit, del.	10.25
Philadelphia, del.	10.65

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	16.00c
Toluol, two degree	22.00c
Solvent naphtha	26.00c
Industrial xylol	26.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (200 lb. drums)	16.25c
Do. (450 lbs.)	15.25c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers	5.75c

Per ton, bulk, f.o.b. port

Sulphate of ammonia	$28.00

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$22.00	$22.50	$21.50	$23.00
Birdsboro, Pa.	22.00	22.50	21.50	23.00
Birmingham, Ala.‡	17.38	.....	16.38	22.00
Buffalo	21.00	21.50	20.00	22.00
Chicago	21.00	21.00	20.50	21.50
Cleveland	21.00	21.00	20.50	21.50
Detroit	21.00	21.00	20.50	21.50
Duluth	21.50	21.50	.....	22.00
Erie, Pa.	21.00	21.50	20.50	22.00
Everett, Mass.	22.00	22.50	21.50	23.00
Granite City, Ill.	21.00	21.00	20.50	21.50
Hamilton, O.	21.00	21.00	20.50	.....
Neville Island, Pa.	21.00	21.00	20.50	21.50
Provo, Utah	19.00	.....	.....	.....
Sharpsville, Pa.	21.00	21.00	20.50	21.50
Sparrow's Point, Md.	22.00	.....	21.50	.....
Swedeland, Pa.	22.00	22.50	21.50	23.00
Toledo, O.	21.00	21.00	20.50	21.50
Youngstown, O.	21.00	21.00	20.50	21.50

‡Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:

Akron, O., from Cleveland	22.39	22.39	21.89	22.89
Baltimore from Birmingham	22.78	.....	21.66	.....
Boston from Birmingham	22.12	.....	.....	.....
Boston from Everett, Mass.	22.50	23.00	22.00	23.50
Boston from Buffalo	22.50	23.00	22.00	23.50
Brooklyn, N. Y., from Bethlehem	24.50	25.00	.....	.....
Canton, O., from Cleveland	22.39	22.39	21.89	22.89
Chicago from Birminghom	†21.22	.....	.....	.....
Cincinnati from Hamilton, O.	21.24	22.11	21.61	.....
Cincinnati from Birmingham	21.06	.....	20.06	.....
Cleveland from Birmingham	21.32	.....	20.82	.....
Mansfield, O., from Toledo, O.	22.94	22.94	22.44	22.44
Milwaukee from Chicago	22.10	22.10	21.60	22.60
Muskegon, Mich., from Chicago, Toledo or Detroit	24.19	24.19	23.69	24.69
Newark, N. J., from Birmingham	23.15	.....	.....	.....
Newark, N. J., from Bethlehem	23.53	24.03	.....	.....
Philadelphia from Birmingham	22.46	.....	21.96	.....
Philadelphia from Swedeland, Pa.	22.84	23.34	22.34	.....
Pittsburgh district from Neville Island	Neville base, plus 69c, 84c, and $1.24 freight.			
Saginaw, Mich., from Detroit	23.45	23.45	22.95	22.95

	No. 2 Fdry.	Malleable	Basic	Bessemer
St. Louis, northern	21.50	21.50	21.00	.....
St. Louis from Birmingham	†21.12	.....	20.62	.....
St. Paul from Duluth	23.63	23.63	.....	24.13

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $26.50, base; $27.74 delivered Philadelphia.

Gray Forge		Charcoal	
Valley furnace	$20.50	Lake Superior fur.	$25.00
Pitts. dist. fur.	20.50	do., del Chicago	28.34
		Lyles, Tenn.	23.50

†Silvery

Jackson county, O., base: 6-6.50 per cent $25.50; 6.51-7—$26.00; 7-7.50—$26.50; 7.51-8—$27.00; 8-8.50—$27.50; 8.51-9—$28.00; 9-9.50—$28.50; Buffalo, $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base; Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$60.80

First Quality

Pa., Ill., Md., Mo., Ky.	47.50
Alabama, Georgia	47.50
New Jersey	52.50

Second Quality

Pa., Ill., Ky., Md., Mo.	42.75
Georgia, Alabama	34.20
New Jersey	49.00

Ohio

First quality	39.90
Intermediate	36.10
Second quality	31.35

Malleable Bung Brick

All bases	$56.05

Silica Brick

Pennsylvania	$47.50
Joliet, E. Chicago	55.10
Birmingham, Ala.	47.50

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$28.00
Wire cut	$26.00

Magnesite

Imported dead - burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	$45.00
Do. domestic	40.00
Do., f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00
Quickset magnesite grains, f.o.b. Chewelah, Wash., net, bulk	22.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$47.00
Chem. bonded chrome	47.00
Magnesite brick	67.00
Chem. bonded magnesite	57.00

Fluorspar, 85-5

Washed gravel, duty pd., tide, net ton	$21.00-21.50
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	18.00
Do. barge	19.00
No. 2 lump	18.00-19.00

Ferroalloy Prices

Ferromanganese, 78-82%, tidewater, duty pd. $80.00; Do., del. Pittsburgh 85.33

Spiegeleisen, 19-21% dom. Palmerton, Pa., spot 28.00; Do., 26-28%, Palmerton 33.00

Ferrosilicon, 50% freight allowed, c.l. 69.50; Do., ton lot 80.50; Do., 75 per cent 126.00. Spot, $5 a ton higher.

Silicoman, 2½ carbon 88.00; 2% carbon, 93.00; 1%, 103.00. Contract ton price $11 higher; spot $5 over contract.

Ferrotungsten, stand., lb. con. del. cars 1.60-1.65

Ferrovanadium, 35 to 40%, lb., cont. 2.70-2.80-2.90

Ferrophosphorus, gr. ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage, 58.50; electrolytic, per ton, c. l., 23-26% f.o.b. Monsanto, Tenn., 24% $3 unitage 75.00

Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb., contained cr., del. carlots 10.50c; Do., ton lots 11.25c; Do., less-ton lots 11.50c

67-72% carloads, 2% carbon, per lb. contained chrome 16.50c; Do., ton lots 17.25c; Do., less-ton lots 17.75c

	Carloads	Ton lots	Less ton
2% carb.	16.50c	17.25c	17.50c
1% carb.	17.50c	18.25c	18.50c
0.10% carb.	18.50c	19.25c	19.50c
0.20% carb.	19.50c	20.25c	20.50c

Spot ¼c higher

Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb. 0.95

Calcium molybdate, lb. molyb. cont., f.o.b. mill 0.80

Ferrotitanium, 40-45%, lb., con. ti., f.o.b. Niagara Falls, ton lots $1.23; Do., less-ton lots 1.25; 20-25% carbon, 0.10 max., ton lots, lb. 1.35; Do, less-ton lots 1.40. Spot 5c higher

Ferrocolumbium, 50-60%, contract, lb. con. col., f.o.b. Niagara Falls $2.25; Do., less-ton lots 2.30. Spot is 10c higher

Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill 0.80

Ferro-carbon-titanium, 15-18%, ti., 6-8% carb., carlots, contr., net ton $142.50; Do, spot 145.00; Do, contract, ton lots 145.00; Do, spot, ton lots 150.00

15-18% ti., 3-5% carbon, carlots, contr., net ton 157.50; Do, spot 160.00; Do, contract, ton lots 160.00; Do, spot, ton lots 165.00

Alsifer, contract carlots, f.o.b. Niagara Falls, lb. 7.50c; Do, ton lots 8.00c; Do, less-ton lots 8.50c. Spot ½c lb. higher

Chromium Briquets, contract, any quantity, freight allowed, lb. 7.25c; Do, spot carlots, bulk 7.50c; Do, ton lots 8.00c; Do., less-ton lots 8.25c

Tungsten Metal Powder, according to grade, spot shipment, 200-lb. drum lots, lb. $2.00; Do, smaller lots 2.10

Vanadium Pentoxide, contract, lb. contained $1.10; Do, spot 1.15

Chromium Metal, 98% cr., 0.50 carbon max., contract, lb. con. chrome 80.00c; Do, spot 85.00c

88% chrome, contract 79.00c; Do, spot 84.00c

Silicon Metal, 1% iron, contract, carlots, 2 x ⅛-in., lb. 14.00c; Do., 2% 12.50c. Spot ¼c higher

Silicon Briquets, contract carloads freight allowed, ton $69.50; Carload, spot 74.50; Less-ton lots, lb. 3.75c

Manganese Briquets, contract carloads, bulk freight allowed, lb. 4.50c; Ton lots 5.00c; Less-ton lots 5.25c. Spot ¼c higher

Zirconium Alloy, 12-15%, contract, carloads, gross ton $97.50; Do, spot 102.50

34-40%, contract, carloads, lb., alloy 14.00c; Do, ton lots 15.00c; Do, less-ton lots 16.00c. Spot ¼c higher

Molybdenum Powder, 99%, f.o.b. York, Pa. 200-lb. kegs, lb. $2.60; Do, 100-200 lb. lots 2.75; Do, under 100-lb. lots 3.00

Molybdenum Oxide Briquets, 48-52% molybdenum, per pound contained, f.o.b. producers' plant 80.00c

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets: Hot Rolled	Sheets: Cold Rolled	Sheets: Galv. No. 24	Cold Rolled Strip	Cold Drawn Bars: Carbon	Cold Drawn Bars: SAE 2300	Cold Drawn Bars: SAE 3100
Boston	3.88	4.06	5.06	3.85	3.85	5.66	3.71	4.78	4.61	3.46	4.13	8.63	7.23
New York (Met.)	3.84	3.96	3.96	3.76	3.75	5.56	3.40	4.60	4.50	3.51	4.09	8.59	7.19
Philadelphia	3.60	3.60	4.10	3.40	3.40	5.00	3.40	4.55	4.28	3.51	4.06	8.56	7.16
Baltimore	3.70	3.85	3.80	3.55	3.55	5.00	3.55	4.90	5.05	....	4.05	....	....
Norfolk, Va.	3.90	4.00	....	3.75	3.75	5.20	3.75	....	5.40	....	4.15	....	....
Buffalo	3.35	3.82	3.82	3.62	3.40	5.25	3.35	4.40	4.40	3.42	3.75	8.15	6.75
Pittsburgh	3.35	3.60	3.60	3.40	3.40	5.00	3.35	....	4.50	3.35	3.65	8.35	6.95
Cleveland	3.25	3.50	3.50	3.40	3.58	5.18	3.35	4.55	4.62	3.20	3.75	8.15	6.75
Detroit	3.33	3.43	3.68	3.60	3.65	5.27	3.43	4.50	4.59	3.40	3.80	8.45	7.05
Cincinnati	3.60	3.67	3.67	3.65	3.68	5.28	3.42	....	4.57	3.45	4.00	8.50	7.10
Chicago	3.50	3.60	3.60	3.55	3.55	5.15	3.35	4.30	4.25	3.50	3.75	8.15	6.75
Twin Cities	3.75	3.85	3.85	3.80	3.80	5.40	3.60	4.95	4.50	3.83	4.34	8.84	7.44
Milwaukee	3.63	3.73	3.73	3.68	3.68	5.28	3.48	4.43	4.38	....	3.88	8.38	6.98
St. Louis	3.62	3.72	3.72	3.47	3.47	5.07	3.38	4.32	4.52	3.61	4.02	8.52	7.12
Kansas City	4.05	4.15	4.15	4.00	4.00	5.60	3.90	....	5.00	....	4.30	....	....
Memphis	3.90	4.00	4.00	3.95	3.95	5.71	3.75	....	5.00	....	4.31	....	....
Chattanooga	3.80	3.90	3.90	3.85	3.85	5.80	3.65	....	4.40	....	4.39	....	....
Tulsa, Okla.	4.54	4.64	4.64	4.41	4.41	6.01	4.32	....	5.39	....	4.79	....	....
Birmingham	3.50	3.60	3.60	3.55	3.55	5.88	3.35	....	4.85	....	4.43	....	....
New Orleans	3.85	4.65	4.65	3.80	3.80	5.75	4.10	....	4.60	5.00	5.10	....	....
Houston, Tex.	3.50	5.85	6.25	4.05	4.05	5.65	3.95	....	5.25	....	....	....	....
Seattle	3.90	4.10	5.45	3.85	3.95	5.50	3.95	6.50	4.75	....	5.85	....	....
Portland, Oreg.	4.00	4.40	6.10	4.00	4.00	5.50	3.95	6.50	4.75	....	5.60	....	....
Los Angeles	4.00	4.50	6.35	4.00	4.00	6.20	4.20	6.30	5.00	4.45	6.00	10.40	9.55
San Francisco	3.50	3.90	6.00	3.45	3.45	5.05	3.45	6.40	5.15	7.30	6.55	10.65	9.80

	SAE Hot-rolled Bars (Unannealed): 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series
Boston	4.18	7.50	6.05	5.80	7.90
New York (Met.)	4.04	7.35	5.90	5.65	....
Philadelphia	3.85	7.31	5.86	5.61	7.71
Baltimore	3.85	....	....	....	....
Norfolk, Va.	....	....	....	....	....
Buffalo	3.55	7.10	5.65	5.40	7.50
Pittsburgh	3.40	7.35	5.95	5.50	7.60
Cleveland	3.30	7.30	5.85	5.85	7.70
Detroit	3.38	7.42	5.97	5.72	7.19
Cincinnati	3.65	7.44	5.99	5.74	7.84
Chicago	3.70	7.10	5.65	5.40	7.50
Twin Cities	3.95	7.45	6.00	6.09	8.19
Milwaukee	3.78	7.33	5.88	5.63	7.73
St. Louis	3.82	7.47	6.02	5.77	7.87
Seattle	5.65	....	7.80	7.65	8.45
Portland, Oreg.	5.70	....	7.80	7.65	8.50
Los Angeles	4.65	9.40	8.55	8.40	9.05
San Francisco	4.50	9.65	8.80	8.65	9.30

BASE QUANTITIES

Soft Bars, Bands, Hoops, Plates, Shapes, Floor Plates and SAE 1035-1050 Bars: Base, 400-1999 pounds, except 400-14,999 pounds in Twin Cities; 400-3999 pounds in Birmingham; 0-299 pounds (hoops only) in San Francisco; 300-1999 in Los Angeles; 300-4999 pounds in Portland.

Hot Rolled Sheets: Base, 400-1999 pounds, except 0-1999 pounds in New York; 400-14 999 pounds in Twin Cities; 400-3999 pounds in Birmingham; 300-1999 in Los Angeles.

Cold Rolled Sheets: Base, 400-1499 pounds in Chicago, Cincinnati, Cleveland, Detroit, New York and St. Louis; 450-3749 pounds in Boston; 500-1499 pounds in Buffalo; 1000-1999 pounds in Philadelphia; 300-4999 pounds in San Francisco and Portland; any quantity in Twin Cities.

Galvanized Sheets: Base, 0-1499 pounds in New York, Tulsa; 150-1499 pounds in Cleveland, Pittsburgh; 1-9 bundles in Baltimore, Norfolk; 1-6 bundles in Los Angeles; 300-4999 Portland, San Francisco; 450-3749 pounds in Boston; 500-1499 pounds in Birmingham, Chicago, Cincinnati, Detroit, St. Louis; 1500 pounds and over in Chattanooga, Philadelphia; any quantity in Twin Cities.

Cold Rolled Strip: No base quantity; extras apply on lots of all size.

Cold Finished Bars: Base, 1000 pounds and over, except 0-299 pounds in San Francisco.

SAE Hot Rolled Alloy Bars: Base, 1000 pounds and over, except 0.4999 pounds in San Francisco; 0-1999 in Portland.

CURRENT IRON AND STEEL PRICES OF EUROPE

Dollars at Rates of Exchange, July 13

Export Prices f. o. b. Port of Dispatch—

By Cable or Radio

	British gross tons U. K. ports £ s d	Quoted in dollars at current value	Continental Channe or North Sea ports, gross tons **Quoted in gold pounds sterling £ s d
Foundry, 2.50-3.00 Si.	$23.40 5 0 0	$17.89	2 2 0
Basic bessemer	....	19.59	2 6 0
Hematite, Phos. .03-.05	23.57 5 5 0*	.....	.....
Billets	$34.52 7 7 6	$38.34	4 10 0
Wire rods, No. 5 gage	53.24 11 7 6	43.67	5 2 6
Standard rails	$44 46 9 10 0	$48.99	5 15 0
Merchant bars	2.30c 11 0 0	1.95c	5 2 6
Structural shapes	2.09c 10 0 0	1.76c to 1.85c	4 12 6 to 4 17 6
Plates, †¼ in. or 5 mm.	2.29c 10 18 9	2.14c to 2.33c	5 12 6 to 6 2 6
Sheets, black, 24 gage or 0.5 mm.	2.72c 13 0 0	2.95c	7 15 0*
Sheets, gal., 24 ga., corr.	3.29c 15 15 0	3.52c	9 5 0
Bands and strips	2.77c 13 5 0	1.95c to 2.00c	5 2 6 to 5 5 0
Plain wire, base	4.08c 19 10 0	2.33c to 2.76c	6 2 6 to 7 5 0
Galvanized wire, base	4.86c 23 5 0	2.99c to 3.09c	7 17 6 to 8 2 6
Wire nails, base	....	2.66c to 2.85c	7 0 0 to 7 10 0
Tin plate, box 108 lbs.	$ 4.74 1 0 3	....	.....

British ferromanganese $80.00 delivered Atlantic seaboard duty-paid.

Domestic Prices at Works or Furnace—

Last Reported

	£ s d	French Francs		Belgian Francs		Reich Mark
Fdy. pig iron, Si. 2.5	$23.17 4 19 0(a)	$18.00	679.30	$16.15	475	$25.28 63
Basic bess. pig iron	21.65 4 12 6(a)	.....	.....	.....	...	27.89 (b) 69.50
Furnace coke	5.38 1 °4 2	5.96	225	6.87	202	7.62 19
Billets	34.52 7 7 6	27.27	1,029	29.24	860	38.73 96.50
Standard rails	1.99c 9 10 0	1.69c	1,405	2.06c	1,375	2.38c 132
Merchant bars	2.42c 11 12 0††	1.56c	1,304	1.65c	1,100	1.98c 110
Structural shapes	2.17c 10 8 0††	1.52c	1,268	1.65c	1,100	1.93c 107
Plates, †¼-in. or 5 mm.	2.29c 10 19 3††	1.98c	1,650	2.06c	1,375	2.29c 127
Sheets, black	3.08c 14 15 0§	2.35c	1,958‡	2.36c	1,575‡	2.59c 144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	3.61c 17 5 0	3.30c	2,750	4.05c	2,700	6.66c 370
Plain wire	4.08c 19 10 0	2.26c	1,880	2.48c	1,650	3.11c 173
Bands and strips	2.58c 12 7 0††	1.73c	1,444	1.95c	1,300	2.29c 127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel. (a) del. Middlesbrough. 5s rebate to approved customers. (b) hematite. °Close annealed. ††Rebate of 15s on certain conditions.

**Gold pound sterling carries a premium of 75 per cent over paper sterling.

IRON AND STEEL SCRAP PRICES

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated; †indicates brokers prices

HEAVY MELTING STEEL

Birmingham, No. 1	†12.00
Bos. dock No. 1 exp.	13.75-14.00
New Eng. del. No. 1	14.00
Buffalo, No. 1 select	14.00-14.50
Buffalo, No. 1	13.50-14.00
Buffalo, No. 2	12.00-12.50
Chicago, No. 1	13.50
Chicago, auto, no alloy	11.75-12.25
Chicago, No. 2 auto	10.50-11.00
Cincinnati, dealers	11.00-11.50
Cleveland, No. 1	14.50-15.00
Cleveland, No. 2	13.25-13.75
Detroit, No. 1	10.00-10.50
Detroit, No. 2	9.50-10.00
Eastern Pa., No. 1	15.50
Eastern Pa., No. 2	13.50-14.00
Federal, Ill.	10.50-11.00
Granite City, R. R.	11.50-12.00
Granite City, No. 2	10.25-10.75
Los Angeles, No. 1	12.50
Los Angeles, No. 2	11.00-11.50
L. A., No. 1 f.a.s.	14.50
L. A., No. 2 f.a.s.	13.25
N. Y. dock No. 1 exp.	12.00-12.50
Pitts., No. 1 (R. R.)	16.50-17.00
Pittsburgh, No. 1	15.50-16.00
Pittsburgh, No. 2	14.00-14.50
St. Louis, R. R.	11.50-12.00
St. Louis, No. 2	10.25-10.75
San Francisco, No. 1	13.00-13.50
Seattle, No. 1	11.00-12.00
Toronto, dirs. No. 1	9.25- 9.75
Valleys, No. 1	15.50-16.00

COMPRESSED SHEETS

Buffalo	12.00-12.50
Chicago, factory	12.25-12.75
Chicago, dealers	11.00-11.50
Cincinnati dealers	10.50-11.00
Cleveland	14.50-15.00
Detroit	11.50-12.00
E. Pa., new mat.	15.50
E. Pa., old mat.	11.50-12.00
Los Angeles	14.00-14.50
Pittsburgh	15.50-16.00
St. Louis	9.00- 9.50
Valleys	15.00-15.50

BUNDLED SHEETS

Buffalo, No. 1	11.00-11.50
Buffalo, No. 2	10.00-10.50
Cleveland	9.50-10.00
Los Angeles	14.00
Pittsburgh	14.00-14.50
St. Louis	7.00- 7.50
Toronto, dealers	8.00- 8.50

SHEET CLIPPINGS, LOOSE

Chicago	8.00- 8.50
Cincinnati, dealers	6.50- 7.00
Detroit	8.00- 8.50
†Los Angeles	3.75- 4.00
St. Louis	6.00- 6.50
Toronto, dealers	4.25- 4.75

BUSHELING

Buffalo, No. 1	12.00-12.50
Chicago, No. 1	11.75-12.25
Cincin., No. 1, deal.	7.00- 7.50
Cincinnati, No. 2	2.25- 2.75
Cleveland, No. 2	7.50- 8.00
Detroit, No. 1, new	10.00-10.50
Valleys, new, No. 1	13.50-14.00
Toronto, dealers	3.75- 4.25

MACHINE TURNINGS (Long)

Birmingham	†4.50- 5.00
Buffalo	6.00- 6.50
Chicago	7.00- 7.50
Cincinnati, dealers	4.50- 5.00
Cleveland, no alloy	7.25- 7.75
Detroit	5.50- 6.00
Eastern Pa.	8.50- 9.00
Los Angeles	4.50- 5.00
New York	†3.50- 4.00
Pittsburgh	9.25- 9.75
St. Louis	4.50- 5.00
Toronto, dealers	4.25- 4.75
Valleys	9.00- 9.50

SHOVELING TURNINGS

Buffalo	7.25- 7.75
Cleveland	7.50- 8.00
Chicago	7.00- 7.50
Chicago, spcl. anal.	8.00- 8.50
Detroit	6.50- 7.00
Pitts., alloy-free	11.00-11.50

BORINGS AND TURNINGS

For Blast Furnace Use

Boston district	3.35
Buffalo	6.75- 7.25
Cincinnati, dealers	3.25- 3.75
Cleveland	7.50- 8.00
Eastern Pa.	6.50- 7.00
Detroit	5.50- 6.00
New York	†2.50- 3.00
Pittsburgh	8.50- 9.00
Toronto, dealers	3.50- 4.00

AXLE TURNINGS

Boston district	†7.50
Buffalo	9.50-10.00
Chicago, elec. fur.	13.50-14.00
East. Pa., elec. fur.	13.00-13.50
St. Louis	9.00- 9.50
Toronto	4.00- 4.25

CAST IRON BORINGS

Birmingham	†6.00- 6.50
Boston dist. chem.	†4.50
Buffalo	6.75- 7.25
Chicago	6.50- 7.00
Cincinnati, dealers	3.25- 3.75
Cleveland	7.50- 8.00
Detroit	5.50- 6.00
E. Pa., chemical	10.00-11.00
New York	†3.50- 4.00
St. Louis	2.50- 3.00
Toronto, dealers	3.75- 4.25

RAILROAD SPECIALTIES

Chicago	15.25-15.75

ANGLE BARS—STEEL

Chicago	15.25-15.75
St. Louis	13.00-13.50

SPRINGS

Buffalo	15.50-16.00
Chicago, coil	16.00-16.50
Chicago, leaf	15.00-15.50
Eastern Pa.	18.00
Pittsburgh	18.50-19.00
St. Louis	14.00-14.50

STEEL RAILS, SHORT

Birmingham	†12.00-12.50
Buffalo	16.50-17.00
Chicago (3 ft.)	16.00-16.50
Chicago (2 ft.)	16.50-17.00
Cincinnati, dealers	16.75-17.25
Detroit	16.50-17.00
Los Angeles	15.00-15.50
Pitts., 3 ft. and less	18.50-19.00
St. Louis, 2 ft. & less	15.00-15.50

STEEL RAILS, SCRAP

Boston district	†13.50-14.00
Buffalo	15.50-16.00
Chicago	13.50-14.00
Cleveland	16.50-17.00
Pittsburgh	16.00-16.50
St. Louis	13.00-13.50
Seattle	16.00

FROGS, SWITCHES

Chicago	13.50-14.00
St. Louis, cut	13.00-13.50

ARCH BARS, TRANSOMS

St. Louis	13.50-14.00

PIPE AND FLUES

Chicago, net	8.50- 9.00
Cincinnati, dealers	6.50- 7.00

RAILROAD GRATE BARS

Buffalo	9.00- 9.50
Chicago, net	7.50- 8.00
Cincinnati, dealers	6.25- 6.75
Eastern Pa.	12.50-13.00
New York	†8.50- 9.00
St. Louis	8.00- 8.50

RAILROAD WROUGHT

Birmingham	†11.00-11.50
Boston district	†9.50-10.00
Eastern Pa., No. 1	16.00-16.50
St. Louis, No. 1	9.75-10.25
St. Louis, No. 2	11.50-12.00

FORGE FLASHINGS

Boston district	†7.50
Buffalo	12.00-12.50
Cleveland	11.00-11.50
Detroit	9.50-10.00
Los Angeles	9.00
Pittsburgh	13.75-14.25

FORGE SCRAP

Boston district	†6.50
Chicago, heavy	15.50-16.00

LOW PHOSPHORUS

Cleveland, crops	17.50-18.00
Eastern Pa., crops	17.00-17.50
Pitts., billet, bloom, slab crops	19.00-19.50

LOW PHOS. PUNCHINGS

Buffalo	15.50-16.00
Chicago	15.50-16.00
Cleveland	15.00-15.50
Eastern Pa., crops	17.50-18.00
Pittsburgh	17.50-18.00
Seattle	15.00

RAILS FOR ROLLING

5 feet and over

Birmingham	†14.00-15.00
Boston	15.00-15.50
Chicago	17.50-18.00
New York	†14.00-14.50
Eastern Pa.	17.00-17.50
St. Louis	16.00-16.50

STEEL CAR AXLES

Birmingham	†15.00-16.00
Boston district	†14.50
Chicago, net	17.00-17.50
Eastern Pa.	20.50-21.00
St. Louis	16.50-17.00

LOCOMOTIVE TIRES

Chicago (cut)	15.50-16.00
St. Louis, No. 1	12.25-12.75

SHAFTING

Boston district	†15.75-16.00
New York	†15.50-16.00
Eastern Pa.	20.50-21.00
St. Louis, 1¼-3¾".	15.50-16.00

CAR WHEELS

Birmingham	†13.50-14.00
Boston dist., iron	†10.00
Buffalo, steel	16.00-16.50
Chicago, iron	13.50-14.00
Chicago, rolled steel	14.50-15.00
Cincin., iron, deal.	12.50-13.00
Eastern Pa., iron	15.50-16.00
Eastern Pa., steel	18.00
Pittsburgh, iron	14.50-15.00
Pittsburgh, steel	18.50-19.00
St. Louis, iron	14.00-14.50
St. Louis, iron	14.00-14.50

NO. 1 CAST SCRAP

Birmingham	†13.00-13.50
Boston, No. 1 mach.	†11.00-11.50
N. Eng. del. No. 2	12.00-12.50
N. Eng. del. textile	12.50-13.00
Buffalo, cupola	13.00-13.50
Buffalo, mach.	14.00-14.50
Chicago, agri. net	9.50-10.00
Chicago, auto net	12.50-13.00
Chicago, railroad net	11.00-11.50
Chicago, mach. net	12.00-12.50
Cincin., mach. deal.	12.00-12.50
Cleveland, mach.	17.00-17.50
Detroit, cupola, net	12.50-13.00
Eastern Pa., cupola	16.00-16.50
E. Pa., mixed yard	13.50-14.00
Los Angeles, net	13.50-14.00
Pittsburgh, cupola	15.00-15.50
San Francisco, del.	13.50-14.00
Seattle	12.50-13.50
St. Louis, cupola	12.00-12.50
St. Louis, agri. mach.	14.00-14.50
St. L., No. 1 mach.	14.00-14.50
Toronto, No. 1, mach., net	12.00-12.50

HEAVY CAST

Boston dist. break.	†9.50
New England, del.	12.50-13.00
Buffalo, break.	11.00-11.50
Cleveland, break, net	13.00-13.50
Detroit, auto net	12.50-13.00
Detroit, break.	9.50-10.00
Eastern Pa.	14.50-15.00
Los Ang., auto, net.	13.50
New York, break.	†10.50-11.00
Pittsburgh, break.	12.50-13.00

STOVE PLATE

Birmingham	†7.50- 8.00
Boston district	†8.00- 8.25
Buffalo	11.50-12.00
Chicago, net	7.75-8.25
Cincinnati, dealers	6.25- 6.75
Detroit, net	7.00- 7.50
Eastern Pa.	12.50-13.00
New York, fdy.	†10.00-10.50
St. Louis	7.50- 8.00
Toronto dealers, net	6.50- 7.00

MALLEABLE

Birmingham, R. R.	†10.50-11.00
New England, del.	11.50-12.50
Buffalo	13.50-14.00
Chicago, R. R.	15.00-15.50
Cincin., agri., deal.	10.75-11.25
Cleveland, rail	15.50-16.00
Eastern Pa., R. R.	15.00-16.50
Los Angeles	17.50-18.00
Pittsburgh, rail	15.75-16.25
St. Louis, R. R.	12.00-12.50

Iron Ore

Lake Superior Ore

Gross ton, 51½ %

Lower Lake Ports

Old range bessemer	$5.25
Mesabi nonbessemer	4.95
High phosphorus	4.85
Mesabi bessemer	5.10
Old range nonbessemer	5.10

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56.63% con.	9.00-9.25
Cop.-free low phos. 58-60%	nominal

Foreign Ore

Cents per unit, c.i.f. Atlantic

Foreign manganiferous ore, 45.55% iron, 6-10% man. nom.	12.00
No. Afr. low phos.	12.00
Swedish low phos.	12.00
Spanish No. Africa basic, 50 to 60% nom.	11.00
Tungsten, short ton unit, duty pd. nom.	18.50-19.00
N. F., fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$23.00-24.00
Molybdenum ores sulphide, per lb. molybdenum contained, f.o.b. mill	0.75

Manganese Ore

Prices not including duty, cents per unit cargo lots.

Caucasian, 50-52% nom.	29.00
So. African, 50-52% nom.	29.00
Indian, 49-50%	27.00-28.00

Sheets, Strip

Sheet & Strip Prices, Page 86, 87

Pittsburgh — Sheet and strip releases last week were near the best volume for the year to date. Automotive shipments have yet to attain any large volume, but such business is expected within the next few weeks. Sheet production is about 55 per cent, a sharp recovery from the slump to 35 per cent during the holiday weeks. July last year averaged 35 per cent. Strip operations are steady at 30 to 35 per cent, the holiday drop having been relatively small.

Cleveland — Miscellaneous sheet and strip demand is steady, following the post-holiday rebound. Automotive releases continue slow, emphasized by postponement of some shipments as a result of labor interference with new model preparations.

Chicago — No marked upturn in automotive releases is looked for until August. Meanwhile, new sales are light, consisting principally of business from miscellaneous users. Prices are firm in most instances.

New York — Sheet specifications are less active than in June but remain favorable in comparison with those for other products. Demand from stovemakers is off sharply, but releases from manufacturers of refrigerators, washing machines and certain other appliances are well sustained. Prices are holding on what small lots of new business are being placed.

Philadelphia—Lock Joint Pipe Co., Ampere, N. J., is low on section 4 of the Harrisburg, Pa., water supply project at $1,137,657. Steel lined concrete pipe, requiring 3000 tons of 14 gage sheets, was specified. The automotive trade still is specifying slowly. Stove makers continue active, and miscellaneous outlets, including small stampings, refrigerators, radios, ship fittings, etc., are fairly busy. Prices are firm on new business, but it is reported some additions to low-price contracts still are being permitted.

Cincinnati — Specifications from miscellaneous users have recovered since the holiday letdown, but mills cannot be assured of tonnage above 50 per cent of district capacity until heavier automotive releases appear. July demand is expected to fluctuate between 40 and 50 per cent.

Buffalo—Sheet and strip production is higher on an increase in miscellaneous orders. Automotive demand is a trifle heavier, but miscellaneous users are providing most business. Prices are steadier on new bookings.

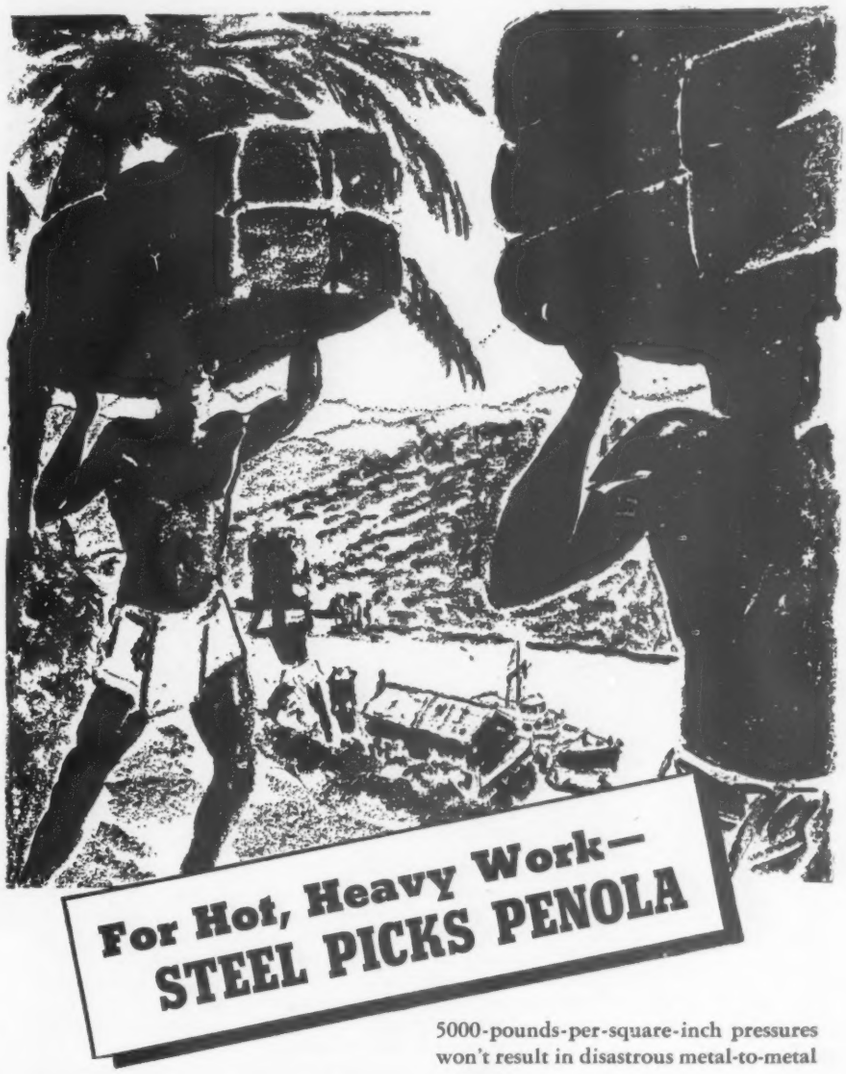
St. Louis—Automotive sheet demand continues slow, but inquiries from country distributors for galvanized sheets are heavier. Enameling stock is quieter, reflecting a seasonal letdown among some users. Warehouses are expected to buy sparingly until old stocks are worked off.

Birmingham, Ala.—Sheet production is holding near capacity. Demand is rather evenly divided between manufacturers' and roofing. Strip, because it has been produced at intervals throughout the year, is being turned out on schedules to meet convenience of other departments.

Plates

Plate Prices, Page 86

Cleveland—Low bidder on the intake section of the Toledo, O., waterworks project specified concrete for the larger diameter pipe and it is thought likely this type material will be employed. Use of steel pipe would involve 8000 to 10,-



STEEL men can't afford to skimp on roll neck bearings or reduction gears. With high-friction steel jobs as tough as they are today, it pays to get the *best!*

And to protect this fine, expensive machinery against damaging friction, these same buyers aren't satisfied with merely "adequate" lubricants. They want a margin of *safety.* That's why *they specify Penola!* Then they *know* that those 5000-pounds-per-square-inch pressures won't result in disastrous metal-to-metal contact.

We think it's significant that 80% of the 4-high mills in this country protect such big rolling mill investments with Penola. Penola has been the *heavy* favorite with men who make steel for over half a century.

PENOLA LUBRICANTS

Penola, Inc., Pittsburgh, Pa.
(Formerly Pennsylvania Lubricating Company)
New York • Chicago • Detroit • St. Louis

LUBRICANTS FOR THE STEEL INDUSTRY SINCE 1885

000 tons of plates, depending on diameter adopted.

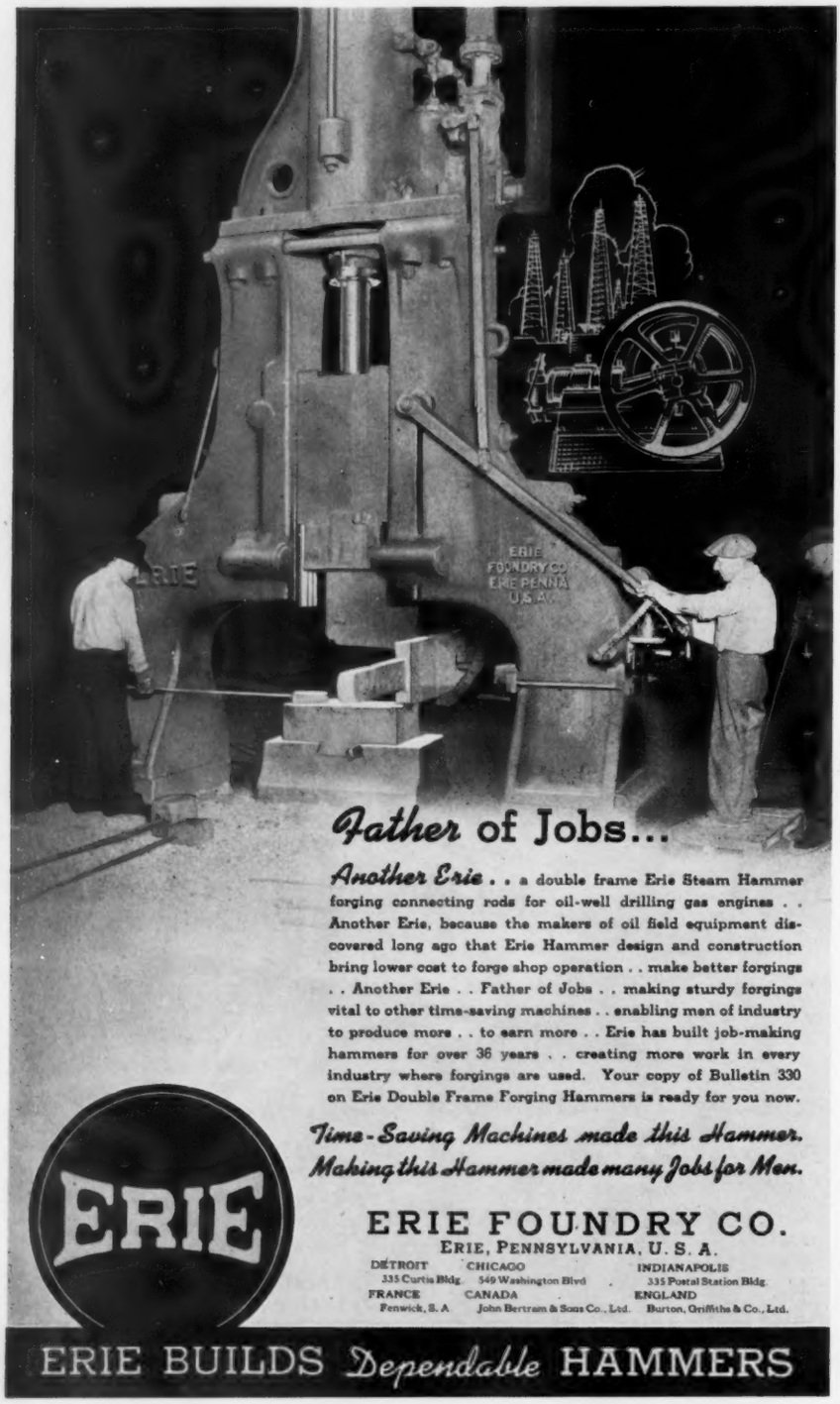
Chicago—Demand is fair, especially for western and midwestern pipe lines. These include 8300 tons for a 66-mile line being furnished the El Paso Natural Gas Co. in New Mexico by the Milwaukee fabricator. Requirements of tank builders and miscellaneous plate fabricators are fairly steady. Railroad needs are light.

New York—Plate bookings so far this month have been light, but prices appear stronger despite absence of a test. Prospective business includes 500 to 600 tons for the Lackawack dam, Ulster county, bids July 25; an unstated number of C-1 boats to be bought by the maritime commission; and 150 to 300 subway cars for the local municipal system. Specifications for the cars are expected within the next 30 days.

Philadelphia—Firmer prices were reflected in last week's opening of bids by the navy on 21,300 tons of material for two 45,000-ton battleships for the Philadelphia and Brooklyn yards. Bulk of the 17,200 tons of black plates required were bid at published prices, with several lots at concessions of 5 to 11 cents per 100 pounds. On 3400 tons of galvanized plates, most bidders cut 5 cents. Requirements also included 700 tons of sheets and strip. Private shipyards are releasing plates in lots of several hundred tons. Railroads are inactive buyers, but prospects for repair programs are bright. Export prices are firmer, with demand more active, particularly from Holland and Sweden.

Birmingham, Ala.—Bookings of plates continue highly satisfactory, a considerable volume going into the tank trade and some tonnage having been booked here for the Mobile river tube at Mobile, Ala. In addition there has been a satisfactory volume of miscellaneous plate business.

Seattle — Unstated interests will furnish plates involved in an untanking building for Bonneville authority. Seattle's Warren avenue water system extension went all cast iron, eliminating 500 tons of plates for 24-inch mains.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CANADA John Bertram & Sons Co., Ltd.
ENGLAND Burton, Griffiths & Co., Ltd.
ERIE BUILDS Dependable HAMMERS

Plate Contracts Placed

625 tons, blast furnace alterations, Republic Steel Corp., Warren, O., to William B. Pollock Co., Youngstown, O.; includes some structurals.

Plate Contracts Pending

1400 tons, ¾-inch plate, penstocks for Stevens dam, Washington state flood control project; bids to U. S. engineer, Seattle, Aug. 8.

Bars

Bar Prices, Page 86

Cleveland—Steel releases from automotive partsmakers have been held up in a few instances because of the tool and die strike. Since such shipments previously had been light, the suspension is without major effect on bar demand. Recovery in business elsewhere the past week was fairly general, although activity has not yet moved above the preholiday level.

Chicago—Prospects for better bar demand the next 30 days are brighter. Needs of farm equipment builders are growing as plants recently idle have reopened and production is expanding, particularly on new small tractors. Bar stocks are low in hands of this group as well as among automotive interests. Prices are firm.

New York—Business from govern-

ment arsenals is a strong support to bar demand, particularly for special alloy and full-drawn material. Airplane equipment interests are placing orders of moderate size. Bolt and nut makers covered on a fair-size tonnage last month that will accommodate them for some time at present consumption. Railroad demand is negligible.

Philadelphia — Miscellaneous bar demand is holding well, but warehouses are doing little stock replacement. Makers of heavy forgings are encouraged by better inquiries, with light forging demand restricted by quiet in automotive needs. Manufacturers of material handling equipment are fairly well employed.

Buffalo — Bar production is back to the pre-holiday rate, and producers see in the steady stream of miscellaneous orders indications that summer demand will exceed earlier expectations. Automotive orders still are slow to expand, but structural projects help support operations.

Birmingham, Ala. — Reinforcing bars continues to constitute most bar business here. Some improvement in demand from manufacturers of agricultural implements is noted.

Pipe

Pipe Prices, Page 87

Pittsburgh—Pipe markets show little change. Oil country goods are moving better at times, but the trend is not general. Standard pipe demand is fair. Line pipe business is quiet, though one or two large lines under consideration for many months are reported near the bidding stage. Pressure tubing is dull, with railroad buying light. Mechanical tubing is moving fairly well to miscellaneous users. Metal furniture plants are a little more active.

Chicago—Cast pipe is quiet, with large inquiries absent. Demand for pipe required in WPA work is appearing occasionally in small lots, but last contracts for PWA projects were placed over a month ago. Requirements involved in the Chicago subway are being filled from city yard stocks.

Birmingham, Ala.—The sustained recovery in pipe, attributable in the main to miscellaneous buying in comparatively small lots, has been one of the most heartening features of the industrial picture. Operations are on a five and six-day per week basis.

New York—The Lackawack dam project in Ulster county will require 30,000 feet of small-diameter pipe, principally for grouting, and 140 tons of heavier pipe and fittings. Demand otherwise is quiet, with little coming from oil companies and merchant business spotty. Resale prices are weak.

Seattle — Seattle's Warren avenue water system extension went ali cast iron, subcontract for 950 tons of 12 to 24-inch going to H. G. Purcell for United States Pipe & Foundry Co. Bids are in for District 58, Seattle, and for 150 tons of 4 and 6-inch mains for the Gilbert district, Portland. No important projects are up for figures.

Cast Pipe Placed

950 tons, 12 to 24-inch, Warren avenue extension, Seattle, to H. G. Purcell, Seattle, for United States Pipe & Foundry Co., Burlington, N. J.

Cast Pipe Pending

150 tons, 4 and 6-inch, (alternate transite) Gilbert district, Portland, Oreg.; bids in.

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Wire

Wire Prices, Page 87

Pittsburgh—Wire shipments have increased, mostly on better manufacturing demand. Merchant products are quiet, with some test inquiries out and no price weakening reported. Early indications are for a fair buying season this fall. Some business has appeared from auto partsmakers, but few releases have been received from the motor companies. Miscellaneous wire users are supporting operations mostly with spot buying.

Cleveland—Business is relatively active, considering that June bookings in wire products were heavy and that demand is receiving little support from the automotive industry. Recovery from the seasonal letdown early this month has been prompt, aided by diversified orders for manufacturers' wire from miscellaneous users.

Boston—Wire buying is maintained with some slight gain in demand for manufacturers' wire. First half volume for the latter is well ahead of last year in this district. Specialties are uneven, but the aggregate tonnage holds well. Finishing operations are erratic, depending on current orders, with backlogs light. The bulk of business is for prompt delivery. Prices are firm with the exception of building wires. Rod volume is light.

Birmingham, Ala.—Wire products continue one of the major products, virtually all sizes and specifications apparently finding ready market.

INLAND FLOOR PLATE Gives 4-WAY Protection

1 **INCREASES SAFETY**—The cleated surface gives better, firmer traction in all directions. Accidents are fewer. Traffic moves faster—safely.

2 **SPEEDS PRODUCTION**—men and machines move faster over safe, firm floors.

3 **LASTS LONGER**—No other flooring material compares with rolled steel for strength, toughness and resistance to continuous traffic wear.

4 **CUTS FLOOR MAINTENANCE COSTS**—Inland 4-Way Floor Plate cannot split, chip, roughen. It is easy to clean—reduces maintenance cost to a minimum.

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INLAND STEEL CO.

38 South Dearborn Street, Chicago

Sheets • Strip • Tin Plate • Bars • Plates • Floor Plates • Structurals • Piling • Rails • Track Accessories • Reinforcing Bars

Rails, Cars

Track Material Prices, Page 87

Nickel Plate inquiry for ten 100-ton gondola cars for carrying fitted containers and the Seaboard Air Line inquiry for seven or 14 streamlined lightweight coaches feature a decidedly dull car market. However, in about two weeks the New York board of transportation will ask bids on 150 to 300 subway cars.

United States engineer, Seattle, is asking bids on 405 tons of 40-pound rails for bottom lining in a nine-foot tunnel for the Stevens dam project, Washington.

South African railways and harbors administration has divided an order for 29,000 tons of rails between Algoma Steel Corp., Sault Ste. Marie, Ont., and Dominion Steel & Coal Corp., Sydney, N. S. This is in addition to 65,000 tons divided among nine railmakers in Great Britain.

Car Orders Placed

Santa Fe, seven passenger cars, lightweight construction, six types; to Pullman-Standard Car Mfg. Co., Chicago.

Car Orders Pending

Nickel Plate, ten 100-ton gondolas for conveying fitted containers, bids asked.
Seaboard Air Line, seven to 14 streamlined coaches, bids asked.

Buses Booked

J. G. Brill Co., Philadelphia: Eleven 40-passenger for Shreveport Railways, Shreveport, La.
American Car & Foundry Motors Co., New York; Twelve coaches for Harrisburg Railways Co., Harrisburg, Pa.

Brazing Alloys Reduced

New York — Following recent silver price reduction Handy & Harman announces revised prices for brazing alloys, Sil-Fos being reduced 20 cents per pound and Easy-Flo reduced 3½ cents per troy ounce. Mored favorable shipping arrange-

ments have also been made. A new price list is available from the company or distributors.

Shapes

Structural Shape Prices, Page 86

New York — Approximately 7600 tons of steel, including a few hundred tons of castings but not including 30,000 lineal feet of small pipe, are being figured for the Lackawack dam, Ulster county, a section of the Delaware aqueduct project of the New York board of water supply. General contractors bids will be opened July 25, with the total cost of the work estimated at $15,000,000 to $20,000,000. Construction will require six years. Reinforcing steel represents the largest single item, involving 3000 tons, with 1675 tons of structurals, second, and 1110 tons of sheet piling, third. In addition, there will be about 565 tons, principally plates, for inner-lining of substructure of efficient chamber; and 1110 tons of castings and miscellaneous types of rolled steel; also 140 tons of steel pipe and fittings and 30,000 lineal feet of small pipe, mainly 2½ inches diameter, and not exceeding that diameter. This latter pipe will be used principally for grouting, with some for venting.

Pittsburgh — Awards are holding up fairly well, but inquiries have receded slightly. This condition is regarded as temporary since numerous jobs are scheduled to appear for bidding shortly. Harris Structural Steel Co. booked 14,000 tons of shapes and plates for the Maryland state Potomac river bridge between Ludlow Ferry, Md., and Dahlgren, Va.

Cleveland—Bridge work continues to dominate new inquiries and awards, with private work remaining almost dormant and little improvement in prospect. Wisconsin Bridge & Iron Co., is low bidder on 1500 tons for the superstructure, Columbus road bridge here. Bids are expected to be out soon on approximately 2000 tons for the connecting link between North ramp and Lake Shore drive, Main street bridge project here. Awards are expected momentarily on a number of state bridge jobs and two Cleveland school projects. Fabricators are fairly busy on former bookings, but volume of new inquiries are somewhat disappointing. Prices remain unsteady.

Chicago — Demand is quiet with no sizable new inquiries announced, although several significant tonnages have been awarded. Bethlehem Steel Co. booked 700 tons for Abbott hall, 18-story men's dormitory, Northwestern university. Largest pending tonnage involves 2000 tons of shapes and approximately 8000 tons of plates for Chicago subway contract S-3, on which S. A. Healy Co., White Plains, N. Y., is low.

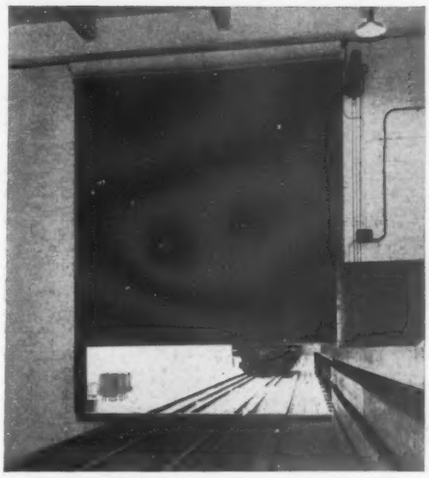
Philadelphia — Considerable tonnage remains before the trade, but

Shape Awards Compared

	Tons
Week ended July 15	22,858
Week ended July 8	21,143
Week ended July 1	14,850
This week, 1938	12,925
Weekly average, year, 1938	21,568
Weekly average, 1939	22,377
Weekly average, June	17,590
Total to date, 1938	457,226
Total to date, 1939	626,580

Includes awards of 100 tons or more.

TWELVE WAYS THEY SAVE



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OPENS OUT OF REACH OF WIND AND TRUCKS

EFFECTIVELY COUNTER-BALANCED FOR SMOOTH, EASY OPERATION

VERTICAL OPERATION SAVES USABLE SPACE

RUGGED CONSTRUCTION DEFIES INTRUSION

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HOT-DIP GALVANIZED TO RESIST RUST AND THE ELEMENTS

FLEXIBLE ASSEMBLY ABSORBS PUNISHMENT

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Factories: Columbus, Ohio and San Francisco, Cal.

little is appearing the last few days. This is believed temporary, however, with shipbuilders taking substantial tonnage and a nearby interest placing around 1000 tons with a district mill recently. The domestic price market is firmer. A local fabricator recently brought in 650 tons Belgian shapes at reported price of 1.80c, delivered plant, largest in some time.

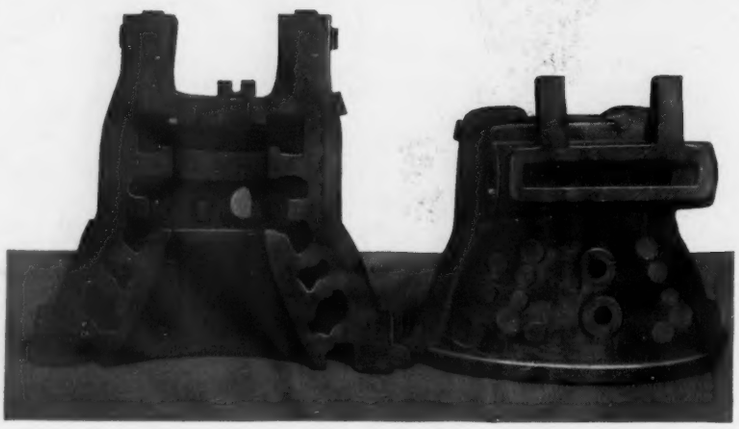
Buffalo — While recent awards have swelled tonnage on fabricators' books, the number of new projects is running behind that of recent weeks. There are still several fair sized projects on which general contracts have been awarded but steel orders are pending.

St. Louis—Some small projects have been awarded recently involving tonnages ranging from 20 to 60 tons. No major lettings are looked for this month. Operations at fabricating yards are 25 to 35 per cent of capacity, with backlogs smaller than a month ago.

Birmingham, Ala. — Structural shapes are in fairly steady demand, specifications having held up exceedingly well in comparison with other products. Fabricators are on active schedules because of highway construction and miscellaneous private building.

Seattle — Interest centered in opening of bids at Denver, July 12, for drum gates and other items for Coulee dam, about 6000 tons. About 1000 tons are pending in various highway projects for Washington state.

SPECIFY "*Standard*" FOR QUALITY



STEEL CASTINGS

Standard castings are produced—from furnace charge to finished product—under the direct supervision of Standard's engineers. Each operation is in the hands of experienced workmen, most of whom have spent their lives at Standard.

This centralized control is in large measure responsible for the high quality of Standard products.

"*Standard*"
STEEL WORKS COMPANY
Subsidiary of The Baldwin Locomotive Works
GENERAL SALES OFFICE: PHILADELPHIA, PA.
District Offices
NEW YORK CHICAGO ST. LOUIS SAN FRANCISCO PORTLAND, ORE.

Shape Contracts Placed

14,000 tons, Potomac river bridge, Ludlow Ferry-Dahlgren, Va., for state of Maryland, to Harris Structural Steel Co., New York.

700 tons, Abbott hall, Northwestern university men's dormitory, Chicago, to Bethlehem Steel Co., Bethlehem, Pa.; through R. C. Wieboldt, general contractor, Chicago.

680 tons, Central high school, Cleveland, to Pittsburgh Bridge & Iron Co., Pittsburgh; through Shirmer Peterson Co., Cleveland.

600 tons, viaduct No. 5273, Cloquet, Minn., for state of Minnesota, to Worden-Allen Co., Milwaukee.

550 tons, bridges, FA-75, Cordova, Iowa, for state of Iowa, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

500 tons, store and theater building, New York Life Insurance Co., New York, to Lehigh Structural Steel Co., Allentown, Pa.

500 tons, overpass, San Antonio, Tex., to Alamo Iron Works, San Antonio.

380 tons, Texas & Pacific railroad bridge, Roanoke, Tex., to Virginia Bridge Co., Roanoke, Va.

320 tons, bridge, FAP 200-D, Garvin county, Oklahoma, to Capitol Steel & Iron Co., Oklahoma City.

300 tons, factory building, Scholler Bros., Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

300 tons, Hillman junior high school, Youngstown, O., to Pittsburgh Bridge & Iron Co., Pittsburgh; through Charles Shrutrump & Sons, Youngstown.

290 tons, Illinois Union building, Urbana, Ill., to Duffin Iron Co., Chicago.

255 tons, bridge, FAS 13-A, McCurtain county, Oklahoma, to J. B. Klein Iron & Foundry Co., Oklahoma City, Okla.

245 tons, Wardway Paint Co., building, Chicago Heights, Ill., to Joseph T. Ryerson & Sons Co., Chicago.

235 tons, music building, Normal school, Fredonia, N. Y., for state of New York, to Erie Concrete & Steel Co., Erie, Pa.

205 tons, bridge span, Humboldt, Iowa, to American Bridge Co., Pittsburgh.

200 tons, power plant improvements, city of Corbin, Ky., to L. Schreiber & Sons, Norwood, O.

200 tons, sheet piling, Ballard bridge project, Seattle, to Bethlehem Steel Co., Seattle.

185 tons, bridge PS-1672-No. 2, Jefferson county, Wisconsin, to Milwaukee Bridge Co., Milwaukee.

180 tons, bridge, section 2SF-FAGM, Iroquois county, Milford, Ill., to Milwaukee Bridge Co., Milwaukee.

173 tons, New York Central railroad bridge, Lucas county, Ohio, to Fort Pitt Bridge Works, Pittsburgh; through C. B. Moon Co., Cleveland.

165 tons, TVA-209113, 17 transmission towers, Godwin, Tenn., to Lehigh Structural Steel Co., Allentown, Pa.

150 tons, bridge, FAS-1702, Oklahoma

City, Okla., to Capitol Steel & Iron Co. Oklahoma City.

150 tons, building, Meadville, Pa., for Montgomery Ward & Co., to Rogers Structural Steel Co., Corry, Pa.

150 tons, village bridge, Warren, Me., for state of Maine, to American Bridge Co., Pittsburgh.

145 tons, Woodhill homes housing project, Cleveland, to Paterson-Leitch Co., Cleveland.

140 tons, coke dock building, Electro Metallurgical Co., Alloy, W. Va., to Bethlehem Steel Co., Bethlehem, Pa.

140 tons, warehouse, Johns Hopkins hospital, Baltimore, to Maryland Steel Products Co., Baltimore.

140 tons, TVA-196849, trash racks, etc., Hiwassee, N. C., to Ingalls Iron Works Co., Birmingham, Ala.

130 tons, state bridge, FAGH-264-B, Fessenden, N. D., to Illinois Steel Bridge Co., Jackson, Ill.

120 tons, completion AC Hangar No. 1, Scott Field, Ill., for United States government, to Columbia Iron Works, Cincinnati, O.

120 tons, building, New London, Conn., for Montgomery Ward & Co., to Bethlehem Fabricators Inc., Bethlehem, Pa.

110 tons, power house, Keystone Steel & Wire Co., Peoria, Ill., to Mississippi Valley Structural Steel Co., Decatur, Ill.

100 tons or more, open grill decking, Ballard bridge, Seattle, to Irving Subway Grating Co., New York.

100 tons, bridge, Madison county, Ohio, to Fort Bridge Works, Pittsburgh.

Shape Contracts Pending

6000 tons or more, drum gates and other items, Coulee dam; bids in at Denver.

1675 tons, for Lackawack dam, Ulster county, section of Delaware aqueduct project of board of water supply, New York, bids July 25; also involved are 3000 tons reinforcing steel, 1110 tons sheet piling and other items, bringing total to 7600 tons, including several hundred tons of castings.

1500 tons, superstructure Columbus road bridge, Cleveland; Wisconsin Bridge & Iron Co., Milwaukee, low.

1200 tons, Sixth street viaduct, Cincinnati, O.; Fort Pitt Bridge Works, Pittsburgh, low.

800 tons, plant, Goodrich Tire & Rubber Co., Clarksville, Tenn.; Batson Cook, West Point, Ga., low.

700 tons, Tenth street viaduct, Omaha, Nebr., for state of Nebraska.

500 tons, dynamometer laboratory building, Dayton, O., for United States government.

325 tons, Terrace Village housing project, Pittsburgh, Pa., for Pittsburgh, housing authority.

250 tons, grade crossing, Franklin county, Ohio; B. F. Patterson Co., Columbus, O., low.

200 tons, Central high school addition, Rochester, Minn.; for board of education.

200 tons, railroad bridge, Queens, New York, for state of New York.

180 tons, alterations, Horn & Hardart restaurant, Philadelphia.

175 tons, beam spans, various locations, for Great Northern railway.

135 tons, grandstand, Rutland, Vt., for County Agricultural society.

125 tons, service and storage building, St. Louis, Mo., for Greyhound Lines.

125 tons, paper mill, Columbus, O., for Ohio Wax Paper Co.

115 tons, building addition and power house, Dannemora, N. Y., for state of New York.

100 tons or more, trashracks, gates, etc., Stevens dam, Washington; bids to United States engineer, Seattle, Aug. 8.

Unstated, two traveling cranes for Coulee; bids to Denver July 20.

Unstated, completion of four large hangars, McChord Field, Wash.; bids to Fort Lewis, July 31.

Unstated, raising Columbia river bridge at Cascade Locks; bids to Wauna Toll Bridge Co., Walla Walla, Wash., Aug. 3.

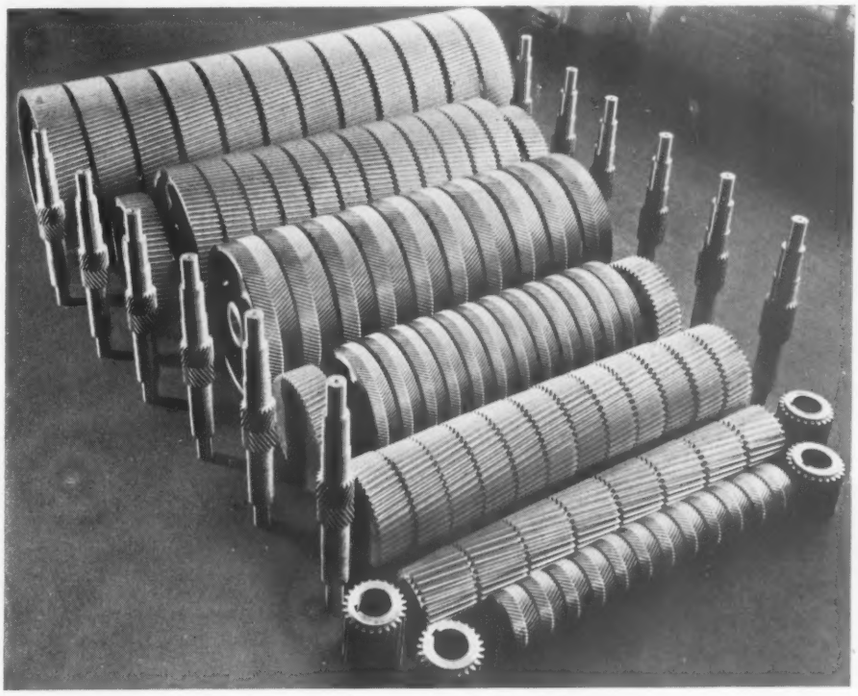
Unstated, ring seal gates for Coulee power plant; Joshua Hendry Iron Works, San Francisco, low.

Unstated tonnage, addition, Glenville high school, Cleveland; bids Aug. 7.

Reinforcing

Reinforcing Bar Prices, Page 87

Pittsburgh — Concrete bar market is quiet, with prices at a good level in most instances. A few scattered jobs went at lower prices but in the main the situation is satisfactory. Because of the holiday and related factors, inquiries and awards have been lighter. West Virginia Rail Co., Huntington, W. Va., was awarded 1575 tons for a



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THE HORSBURGH & SCOTT CO.

GEARS AND SPEED REDUCERS

5112 HAMILTON AVENUE • CLEVELAND, OHIO, U. S. A.

flood wall at Kenova, W. Va., from United States engineers.

Cleveland—Private inquiries and awards are few and little improvement is in prospect. Western Foundation Co., Cleveland, is low on 160 tons of bars and 700 tons of piling for the substructure of Columbus road bridge project here. Awards are expected soon on two school jobs involving approximately 500 tons of joists and bars. Prices remain weak.

Chicago — Shipments continue heavy, with producers' backlogs being reduced rapidly. Estimates of producers indicate that between 3000 and 6000 tons are pending in Chicago and surrounding territory. The estimating bureau here is reported to have 30 district projects for which figures are not yet completed. All in all producers state demand for bars is holding up well and the outlook is encouraging.

Philadelphia — It is reliably reported the Pennsylvania turnpike commission will ask new bids on several large Harrisburg-Pittsburgh express highway tunnel and bridge jobs. Other work is in fair volume. Prices are steadier but still unsatisfactory.

Seattle — Rolling mills report fair volume of shop and warehouse orders, mostly in small tonnages. The market is firmer at 2.40c following a decline frim 2.65c some time ago. The largest job pending involves 1350 tons for the Stevens dam, Washington, bids to United States engineer, Seattle, Aug. 8. About 1000 tons are pending for various highway jobs in Washington.

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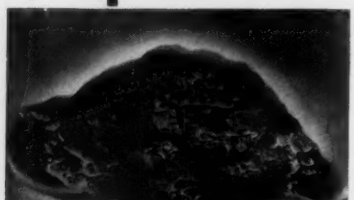
COMPARE:
This sludge from low cost heavy fuel oil, with high B.T.U. value, approximately 180,000 B.T.U. per gallon, is utilized by "Salem" equipment.



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The result is that today "Salem" is able to offer systems for burning the heavy oils economically, without shutdowns due to clogged lines or valves, and with all the control possible with gas or other fuels.

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If you are located where oil shipments may offer economies over other fuels why not call in a qualified "Salem" representative—who will be glad to discuss the potentials with you—or, avail yourself of the offer at the right.

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To assist in making the results of our specialized studies on oil fuels as pertinent to your specific problem as possible—we offer to make for you—a preliminary survey of your fuel problem without obligation to you, or, a complete fuel report at nominal cost.

SALEM, OHIO: CHICAGO DETROIT PITTSBURGH NEW YORK LONDON PARIS BERLIN — WELLAND, ONT.

SALEM ENGINEERING COMPANY

Reinforcing Steel Awards

3000 tons, Chicago subway section D-3, to Ceco Steel Products Corp., Cicero, Ill.; through Paschen Bros. Construction Co., Chicago, general contractor.

1575 tons, United States engineers, Huntington, floor wall, Ceredo-Kenova, W. Va., to West Virginia Rail Co., Huntington, W. Va.

600 tons, sewage plant, Waterloo, Iowa, to Republic Steel Corp., Cleveland.

300 tons, Archer-Daniels elevator, Decatur, Ill., to Laclede Steel Co., St. Louis.

268 tons, addition, sewage disposal plant, Gary, Ind., to Truscon Steel Co., Chicago; through Strandberg & Spencer, Chicago, general contractor.

200 tons, Atchison Elevator Co., building, Minneapolis, to Laclede Steel Co., St. Louis.

200 tons, Chicago Rival Packing Co. building, Chicago, to Inland Steel Co., Chicago.

180 tons, power plant, city of Holland, Mich., to Calumet Steel Co., Chicago.

150 tons, port improvements, contract No. 2, Monroe, Mich., to Great Lakes Steel Corp., Detroit.

Unstated, additional grain bins, Vancouver, Wash., elevator; Alloway & Georg, Spokane, general contractors.

Reinforcing Steel Pending

3000 tons, Lackawack dam, contract No. 340, New York (Delaware aqueduct); bids July 25.

2000 tons, Ida B. Wells low-cost housing project, Chicago.

1350 tons, Stevens dam, Washington state; bids to United States engineer, Seattle, Aug. 8.

575 tons, Commonwealth Edison Co., building, Chicago.

500 tons, Rosenbaum Elevator Co. building, Chicago.

250 tons, underpass, Damen & Seventh streets, Chicago.

Concrete Bars Compared

	Tons
Week ended July 15	6,473
Week ended July 8	6,828
Week ended July 1	10,819
This week, 1938	4,002
Weekly average, year, 1938	6,959
Weekly average, 1939	9,955
Weekly average, June	10,667
Total to date, 1938	152,405
Total to date, 1939	278,770

Includes awards of 100 tons or more.

250 tons, Freedmen's hospital, Washington.
250 tons, bridge, Owensboro, Ky.
160 tons, substructure, Columbus road bridge, Cleveland, Western Foundation Co., Cleveland, low; includes 700 tons of piling.

Pig Iron

Pig Iron Prices, Page 88

Pittsburgh—Merchant iron movement is rather slow, although blast furnace operations are the highest since 1937, with 22 stacks active. Some foundries are running behind shipments in an effort to reduce inventories of finished products. Coke shipments are fair and about in line with production. Prices of both pig iron and coke are steady.

Cleveland—New business is heavier so far this month. Orders generally are small but are better than in June despite absence of a similar trend in shipments. Deliveries have increased after a letdown the first ten days of July, when a number of foundries were closed, and are back to about June's daily average. Some heating equipment interests are busier, but output of automotive castings remains slow.

Chicago—Shipments the first half of July were on a par with the June period. While this indicates the letdown in the holiday week has been overcome, sellers no longer expect total shipments this month to exceed June. Holding up of demand for automotive castings is seen as contributing to the lack of improvement so far. Agricultural casting requirements have yet to show marked gain, though gradual improvement is indicated. A slight gain in foundry operations is traceable mostly to jobbers.

New York—Business has gained slightly since early this month, although activity still is light and some sellers expect July to be the slowest month so far this year. Soil pipe and machinery makers are relatively most active buyers. Generally low stocks point to heavier demand on an upturn in consumption. Export inquiries are featureless.

Philadelphia—Stove foundries are seasonally busy, some running at capacity. Jobbing foundries maintain a steady melt, the average for the entire trade being estimated at over 50 per cent. Makers of vitreous enamel ware and pipe are busy. Domestic prices are steady and export quotations are reported $1 higher.

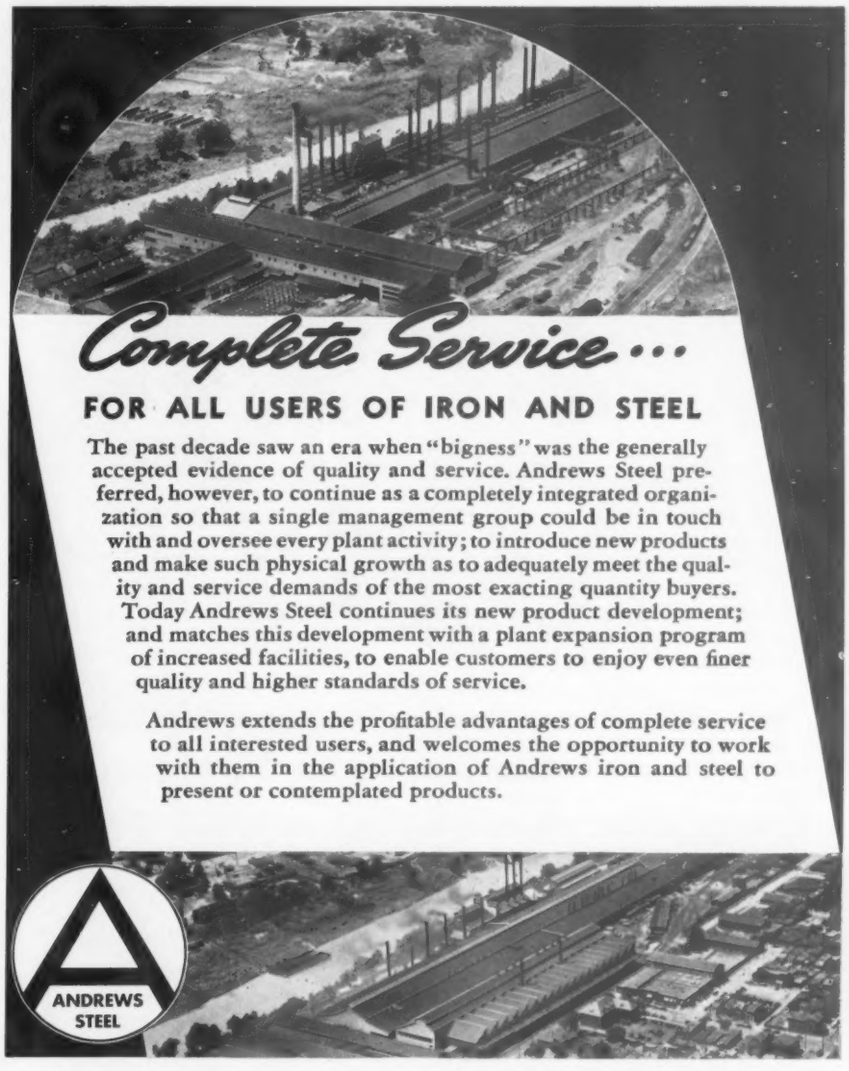
Buffalo — Shipments are ebbing seasonally. Small releases are being supplemented by melters' stocks which are becoming light. Producers expect July deliveries to show a decrease from June. Prices are steady.

Cincinnati — Consumption and shipments have recovered quickly since recent shutdowns. Production of automotive castings is seasonally quiet but machine tool parts continue in steady demand. A large part of foundries' third quarter needs are covered.

St. Louis — Deliveries increased rapidly the past ten days, best gains being to jobbing foundries, which are back to the highest schedules attained in June. Stove foundries are seasonally quiet, but large orders are expected soon for fall delivery. Farm implement plants are preparing to increase operations late this month.

Birmingham, Ala.—Reflecting the increase this week in open hearth operations, pig iron production has increased, the Tennessee company relighting its eighth and last blast furnace. This gives the district a total of 14 active blast furnaces, including two each for Woodward, Republic and Sloss-Sheffield.

Toronto, Ont.—Sales have slipped


Complete Service...
FOR ALL USERS OF IRON AND STEEL
The past decade saw an era when "bigness" was the generally accepted evidence of quality and service. Andrews Steel preferred, however, to continue as a completely integrated organization so that a single management group could be in touch with and oversee every plant activity; to introduce new products and make such physical growth as to adequately meet the quality and service demands of the most exacting quantity buyers. Today Andrews Steel continues its new product development; and matches this development with a plant expansion program of increased facilities, to enable customers to enjoy even finer quality and higher standards of service.
Andrews extends the profitable advantages of complete service to all interested users, and welcomes the opportunity to work with them in the application of Andrews iron and steel to present or contemplated products.
ANDREWS STEEL

NEWPORT PRODUCTS: Hot Rolled Sheets • Cold Rolled Sheets • Newport Electrical Sheets • GOHI Pure Iron-Copper Alloy Sheets • Globe Brand Galvanized Steel Sheets • GOHI Enameling Iron Sheets • KCB Copper Steel Sheets • Newport Long Terne Sheets • Newport Galvannealed and DeLuxe Metal Sheets.

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ANDREWS PRODUCTS in Carbon and Alloy Steel: Blooms • Forging Billets • Re-rolling Billets • Slabs • Universal Mill Plates • Sheet Bars.

to the lowest level for the year to date. Melters generally have sufficient stocks to permit withdrawal from the market for the present, and there is little incentive to order ahead. Production is steady at the year's best rate.

Scrap

Scrap Prices, Page 90

Pittsburgh — Prices of leading steelworks grades are up 50 cents in a strong market. No. 1 steel and compressed sheets now are $15.50 to $16, with railroad steel $16.50 to $17. No. 2 steel and bundled sheets are $14 to $14.50. The advances reflect recent mill sales, dealer offerings and higher markets in the Cleveland and Youngstown districts. Turnings are stronger on recent sales, although mixed borings and turnings are unchanged. Current prices of steelmaking grades are the highest in over three months and equal peak figures for the year to date.

Cleveland—Purchases of scrap by Republic Steel Corp. aggregating 50,000 tons, at $15.50 for No. 1 heavy melting steel for Cleveland and Warren plants caused prices to stiffen here and at Youngstown. Otis Steel Co. is said to have closed on 7000 to 8000 tons of a different classification of heavy steel at $14.50.

Chicago—No. 1 heavy melting steel is quoted a flat $13.50 on the basis of the last mill purchase and the figure brokers must pay for sizable tonnages. A week ago the market was $13.25 to $13.50. Mills show no inclination to pay more than $13.50 and demand generally is inactive. Coil springs and steel car axles are easier.

Philadelphia—Scrap has a decidedly stronger tone and it is believed the next domestic sale of No. 1 steel will bring at least $16 since brokers already are paying $15.50 against contracts and railroad steel brought over $16. No. 2 steel is higher on broker coverage at $13.50 and $13.75. Several sales of breakable cast are noted at $15. Export scrap is active at unchanged prices.

Buffalo—No. 1 steel is up 50 cents to $13.50 to $14, following a previous $1 advance in No. 2 steel on a sale of 6000 tons. A selected grade of No. 1 steel, created because of apparent variations in consumers' specifications, is quoted $14 to $14.50. A dearth of No. 1 steel is reported as exporters are absorbing a good portion of such material from surrounding territories.

Detroit—Borings and turnings are up 25 cents, while other grades are unchanged or a trifle weaker. Improvement in steelmaking here does not indicate an increase in scrap buying immediately.

Cincinnati—Prices are steady despite a sharp reduction in steelmaking. Shipments against orders are small, although no embargoes are in effect. The trade looks for only minor price changes the remainder of July.

St. Louis—The market has a firm undertone, but new buying is quiet and dealers are not inclined to dispose of their small stocks. Mill consumption is in excess of receipts, indicating resumption of buying before long. Offerings are light from all directions.

Seattle — Japan is buying small lots but sales are steadier. The export price is slightly weaker, quotations being $12.50 and $13.50. Domestic mills are buying to cover requirements, at $11.50 and $12.50.

Toronto, Ont. — Demand is unchanged. Machinery cast is the most active grade, with heavy melting steel moving only against contracts. Scrap is coming slowly into dealer yards. Prices are unchanged,

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Manganese and Alloy Steel CASTINGS

FROM ½ TO 1000 POUNDS

1906 — 33 years — 1939

Produced in our modernly equipped foundry from electric furnace steel and heat-treated in automatically controlled gas-fired furnaces.

We are in position to manufacture specialties made of manganese and alloy steel castings and invite concerns to write us about their requirements.

DAMASCUS STEEL CASTING CO.
New Brighton, Pa.
(Pittsburgh District)

with consumers not inclined to raise their bids.

Warehouse

Warehouse Prices, Page 89

Cleveland—Demand has improved with the passing of the holiday and plant vacations and compares favorably with demand a month ago. No major change in total July business is indicated.

Chicago — Business recovered promptly from the holiday letdown and generally is up to expectations, although July to date trails the showing a month ago.

Philadelphia—Business is steady, with some interests reporting July bookings as much as 20 per cent ahead of June. While there is some deviation from published prices, the bulk of business is going at full levels.

Buffalo—Reports vary, some warehouses being surprised at the maintenance of demand, others finding business none too good. Orders are holding better in number than in individual size.

Cincinnati — Sales are well sustained and July has good prospects of matching the June volume. Prices tend toward greater firmness.

St. Louis—Seasonal factors are less depressing than usual, business having been unexpectedly active since the holiday. Demand for building materials is reported satisfactory although curtailed slightly by the WPA strike. Prices are firmer.

Seattle — Prices appear firmer since the new list became effective July 1, although some cutting is reported. Sales continue the same as last month, mostly small tonnages. Portland prices, higher than in Seattle, now are well stabilized. Galvanized sheets continue in best demand here.

Tin Plate

Tin Plate Prices, Page 86

Tin plate production was at 60 per cent last week, up 10 points from the preceding week but still below the 70 per cent rate of late June. July specifications are expected to show some decline from June, with a general downward tendency continuing over the remainder of the canning season which usually runs through September. While preparations for early vegetable packs apparently were in excess of actual requirements, a good fruit season may take up the slack. The pea pack is about 40 per cent below last year's.

Steel in Europe

Foreign Steel Prices, Page 89

London—(*By Cable*)—Steel production in Great Britain continues close to capacity, June output being 1,175,600 gross tons, only 42,500 tons less than the alltime record of 1,218,100 tons in May. June pig iron production totaled 715,700 tons, the highest since January, 1938, and 23,600 tons greater than 692,100 tons in May.

Demand for hematite foundry iron is improving but heavy stocks are still available. Domestic steel trade continues fully active although ordinary commercial demand is yielding to seasonal influence. The first shipment of semifinished steel from Australia is expected soon. Exports are improving, especially to South Africa, the Near East and South America. An order for 66,000 tons of steel rails has been booked for South Africa.

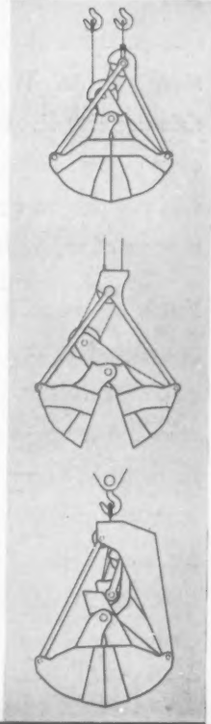
The Continent reports export trade is more active in many markets.

Handling FERROMANGANESE from cars to stock pile this Blaw-Knox Bucket unloads an average of 7 cars per eight hour shift. The former cost of $.65 per ton was *reduced* to $.25 per ton.

This bucket handles LIMESTONE in pieces ranging from 6" to 12" from dock to 50-60 ton gondola, filling car in an average time of 20 minutes.

It unloads SPIEGEL from 50-60 ton car in 1½ hours without teeth, and handles PIG IRON from stock pile at the rate of about ¾ Cu. Yds. per grab.

Blaw-Knox Buckets are designed to meet Steel Mill requirements—put your bucket problems up to Blaw-Knox.



BLAW-KNOX *Digging and Rehandling* **BUCKETS**

BLAW-KNOX DIVISION
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Farmers Bank Bldg. Pittsburgh, Pa.

Iron Ore

Iron Ore Prices, Page 90

New York—Due to continued European demand foreign iron ore prices are strong, with an advance in Spanish North African basic to 11 cents per unit, c.i.f. Atlantic ports. Chinese wolframite is stronger at $18.50 to $19 per short ton unit, although this also is not due to improved demand in this country. Manganese ore is quiet and nominally unchanged at 29 cents per unit, not including duty, for 50 to 52 per cent material.

Ore Imports Decrease

Baltimore—Importations of iron ore here last month totaled 157,854 tons, the lightest aggregate so far this year. The total compared with 172,294 in February, the second smallest total and with 199,008 tons in March, the largest, and brought the aggregate for the first six months up to 1,072,939 tons, against 913,819 in the corresponding period of 1938. In June of last year iron ore imports totaled 150,335 tons, or 7519 tons under the figure for last month.

Manganese ore arrivals last month totaled 37,610 tons, plus an additional 300 bags compared with 39,860 tons in May, the largest monthly total to date and with 12,590 tons in February, the smallest total. Shipments for the first six months aggregated 168,814, against 218,203 in the corresponding period of last year. June shipments in 1938 were 21,980, or 15,630 tons under those of last month.

June chrome ore arrivals amounted to 14,421 tons, against 3108 tons a year ago, and 9418 tons in May. Last month arrivals were the heaviest for any similar period this year and brought the total for the first six months up 40,429 tons, against 76,924 tons in the first half of last year.

Other arrivals last month included 900 tons of ferromanganese, plus 225 barrels; 39,400 bags of magnesite and 8200 tons of ilmenite sand.

SPECIAL EQUIPMENT FOR THE STEEL INDUSTRY

The equipment mentioned at the right has been especially designed for blast furnaces and steel plants. We believe that this concise list of equipment of our design and manufacture will serve you as a convenient means of reference.

Each of these items has been subjected to the test of experience, and the design revised and refined in accordance with its lessons. The equipment listed is thoroughly practical and can be installed at relatively low cost with assurance of a completely successful result.

Further information will be furnished on request.

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Brassert Hot Blast Stove Gas Burner
Brassert Combustion Unit for Regenerative Furnaces
Brassert Boiler Gas Burner
Brassert Plate Type Gas Valve
Brassert Double Seated Gate Type Gas Valve
Brassert Blast Furnace Mud Gun
Brassert Blast Furnace Cinder Notch Stopper
Brassert Blast Furnace Bell Hoist
Brassert Blast Furnace Charging Sequence Control
Brassert Blast Furnace Revolving Top
Brassert Blast Furnace Stock Line Recorder
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Special Method of Drying Out Masonry

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Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 87

Bolt and nut buying is principally in small lots by consumers. Distributors are fairly well covered as the result of orders placed last month, when prices were reduced. Railroad demand is quiet, but automotive needs are slightly heavier in connection with new models, and farm equipment makers shortly are expected to be heavier consumers. Shipyards are relatively the most active users in the East. Bolt and nut production is slightly higher at 35 to 40 per cent.

Ferroalloys

Ferroalloy Prices, Page 88

New York—Ferromanganese shipments are at the June rate, which was exceeded only by March. Prices on domestic ferromanganese are unchanged at $80, duty paid, Atlantic and Gulf ports. Domestic spiegeleisen, 19 to 21 per cent, also is unchanged at $28, Palmerton, Pa., and 26 to 28 per cent at $33. Spiegeleisen demand is steady.

Nonferrous Metals

New York — Following record-breaking sales of 150,504 tons of copper for the week ended July 8, demand tapered steadily last week since consumers' needs have been covered rather fully for the third quarter and well into the fourth quarter. Daily turnover in lead and

Nonferrous Metal Prices

Spot unless otherwise specified. Cents per pound.

July	Copper Electro, del. Conn.	Copper Lake, del. Midwest	Copper Casting, refinery	Straits Tin, New York Spot	Straits Tin, New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
8	10.25	10.25	9.87½	48.60	48.30	4.85	4.70	4.50	20.00	12.00	35.00
10	10.25	10.25	9.87½	45.50	48.25	4.85	4.70	4.50	20.00	12.00	35.00
11	10.25	10.25	9.87½	48.50	48.25	4.85	4.70	4.50	20.00	12.00	35.00
12	10.25	10.25	9.87½	48.50	48.25	4.85	4.70	4.50	20.00	12.00	35.00
13	10.25	10.25	9.87½	48.60	48.25	4.85	4.70	4.50	20.00	12.00	35.00
14	10.25	10.25	9.87½	48.60	48.30	4.85	4.70	4.50	20.00	12.00	35.00

MILL PRODUCTS

F.o.b. mill base, cents per lb., except as specified. Copper brass products based on 10.25c Conn. copper

Sheets

Yellow brass (high) 16.65
Copper, hot rolled 18.37
Lead, cut to jobbers 8.00
Zinc, 100 lb. base 9.75

Tubes

High yellow brass 19.40
Seamless copper 18.87

Rods

High yellow brass 12.00
Copper, hot rolled 14.87

Anodes

Copper, untrimmed 15.62

Wire

Yellow brass (high) 16.90

OLD METALS

Nom. Del. Buying Prices

No. 1 Composition Red Brass

New York 5.87½-6.12½
Cleveland 6.50-6.75
Chicago 6.25-6.50
St. Louis 6.25-6.50

Heavy Copper and Wire

New York, No. 1 .....7.87½-8.00
Cleveland, No. 1 .....7.75-8.00
Chicago, No. 1 .....7.62½-7.87½
St. Louis 7.75-8.00

Composition Brass Turnings

New York 5.12½-5.37½

Light Copper

New York 6.37½-6.62½
Cleveland 6.00-6.25
Chicago 6.25-6.50
St. Louis 6.25-6.50

Light Brass

Cleveland 3.50-3.75
Chicago 4.12½-4.37½
St. Louis 3.75-4.00

Lead

New York 4.00-4.25
Cleveland 3.75-4.00
Chicago 3.60-3.85
St. Louis 3.50-3.75

Zinc

New York 2.50-2.62½
Cleveland 2.00-2.25
St. Louis 2.25-2.50

Aluminum

Borings, Cleveland 6.25-6.50
Mixed, cast, Cleveland.....7.75-8.00
Clips, soft, Cleveland 14.25-14.50
Misc. cast, St. Louis 7.00-7.25

SECONDARY METALS

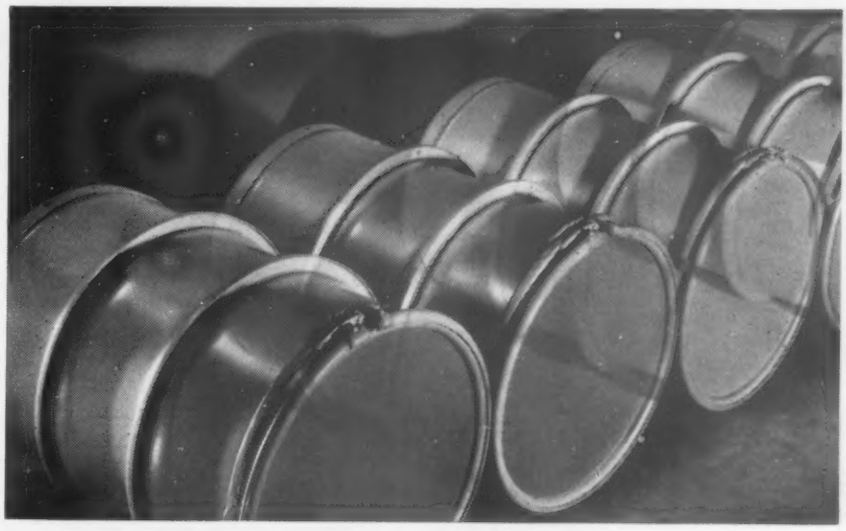
Brass ingot, 85-5-5-5, less carloads..10.50
Standard No. 12 aluminum....11.75-12.00

---

zinc exceeded expectations while that in tin showed signs of improving toward the close of the week.

Copper—Electrolytic copper held firm at 10.25c, Connecticut, the level established on July 7 when sales jumped to 86,123 tons. Sentiment was strengthened by the June statistical report which showed a reduction of 18,630 tons in world copper stocks, including cuts of 11,402 in blister and 7228 tons in refined. Domestic stocks dropped 4546 tons, including 2403 tons of blister and 2143 of refined, while foreign stocks dropped 14,084 tons, including 8999 in blister and 5085 in refined. Fresh buying interest was checked by the appearance of resale metal on the outside market at 10.15c. Activity in the foreign market also quieted down with prices easing to around 10.25c.

Tin—Straits spot fluctuated within the narrow range of 48.50c and 48.65c, closing at 48.55c. One of the features of the market was the manner in which the Eastern market withstood heavy selling. The London market was also firm which made it difficult for importers here to cover their commitments.



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. . . ASSURE SAFE ARRIVAL; FASTER, LOWER COST HANDLING AND SHIPPING

Your customers *expect* the products which they buy from you to arrive safely and promptly. Hackney removable-head drums will help you meet these "buyer" requirements as well as retain customer good-will and satisfaction.

Both receivers and shippers benefit when Hackney-designed and manufactured containers are used. For example, sturdy, long-life construction and the proper balance between maximum strength and minimum weight increase ease and speed of handling, provide worth-while economies.

The removable air-tight head, with bolt or Toggle-tite closure, assures safe arrival and protection of contents. The outward curl of the top edge enables easy, thorough cleaning. The I-bar hoops add strength to the container and allow faster rolling. And there are many more Hackney features which may help you save time and money.

There is a standard Hackney container for almost every need. Let a Hackney engineer help you determine the most practical container for your individual requirement or assist in the development of special containers or shapes, if necessary. There is no obligation; write for details or ask to have an engineer call.

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1461 S. 66th Street MILWAUKEE

Containers for Gases, Liquids and Solids

Behind the Scenes with STEEL

Hard Worker

■ We've introduced you before to one of the most high-powered, hardest working execs in the field, A. H. Friese, President, Welding Engineering Co., Milwaukee. In April of this year, when things were definitely not on the boom side, he wrote that they were swamped with orders and reviewed a trip of two months' constant flying over the entire country opening new offices and raking in the business. Latest missive from up 'n' at 'em Friese says he's still on the fly and finds business swell. Says he got an inquiry from Harbin, Manchuria, China the other day and was all set to hop the Clipper to close the deal but they beat him to it and sent in the order before he could get under way. If you have the same spark of admiration for such a go-getter as we have, maybe you'd like one of the Lucky Penny pocket pieces he sent us. He has plenty more.

Introducing . . .

■ Until knighted this week with a well-deserved place on the masthead, you have had little chance to know five of STEEL's hard-working and capable assistant editors all of whom have helped for many weeks in keeping you well-informed. A curtsy please from Miss LaVerne Nock, assistant news editor, and a gentlemanly bow from Joe Sullivan, business trend prognosticator, Bert Lynn, who tells you what is new in aviation, Armand Finley, experienced technical writer, and John Caldwell, market man deluxe.

Sort Of Like It

■ We have frequent occasions to check on what some certain section of STEEL's readers think of the job we're doing week to week. A selected list of top steel mill executives and operating men last week seemed to think we had a fairly decent little publication. Typical were such mild comments as: *I consider it an excellent publication both in format and content,* from a Pittsburgh works manager. A chief engineer in Johnstown wrote: *I like it all but especially your motordom section.* The general manager of a top-ranking producer says: *Most excellent publication in the industry.* There was no end of *splendids, very interestings,* and *swells.* One mechanical enginer out west had a little different slant. Says he: *I just breeze through like a zephyr and then go back and read the important items carefully.* Which means he misses nothing.

"O. B."

■ From the Helpful Literature dept. comes a poignant story of a new title and an ambitious boy. Requests for manufacturers' literature from a steel company title of "O.B." seemed slightly awry and a check-up was made. Came a letter which said in part: "I realize what a dreadful mistake I made in abbreviating my title, which I really meant for office boy. Some companies may confuse this for official buyer and to save them money they may give representatives to travel here to interview me I wish you would tell them right away what the situation is. My father was injured in the mills and I, being the only child, I have to support the family, so I wrote for this literature which would enable me to learn more about machinery and steel and maybe as a result advance me to a higher position for the benefit of my family. I am sorry to have been such a bother to you and if I can help you in any way please do not hesitate to ask me." We have a sneaking hunch that one day we'll be glad to know this lad, when his title is something more familiar, but perhaps less intriguing than "O.B."

Flanged & Dished Heads

■ If you aren't doing anything tonight, we feel sure we can fix you up with those two lovelies on page 8, and we can swipe an orchid for their hair (gulp!) right next door in that striking Republic spread on pages 6-7. If the conversation dulls turn over to page 9 and tell them how to shred a whale.

SHRDLU

Activities of Steel Users, Makers

■ STOCKHOLDERS of Chain Belt Co., Chicago, have approved acquisition of Baldwin-Duckworth Chain Corp., Springfield, Mass., in exchange for 139,537 shares of Chain Belt common stock. Approval also was given to amend articles of incorporation to increase capital stock from 360,000 to 500,000 shares.

♦

Lukens Steel Co., Coatesville, Pa., has been licensed to produce lead-bearing steels under Inland Steel Co. Ledloy patents.

♦

Van Dorn Electric Tool Co., Towson, Md., has opened a new branch service station at 605 McCarter highway, Newark, N. J., with Harry Bullock in charge.

♦

Warp Twisting-In Machine Co., New York, has changed its name to Sipp-Eastwood Corp., and offices have been moved to 39 Keen street, Paterson, N. J.

♦

Chicago Pulley & Shafting Co., Chicago, has been appointed distributor for Ajax Flexible Coupling Co., Westfield, N. J.

♦

Keystone Steel & Wire Co., Peoria, Ill., has acquired controlling interest in the common stock of National Lock Co., Rockford, Ill. Latter company has total assets of $5,000,000 and annual sales volume is around $4,000,000.

♦

Lawrence Bros. Co., Sterling, Ill., hardware manufacturer, has established a warehouse and office at 2013 East Sixty-fifth street, Cleveland, to serve as a wholesale distribution agency covering Ohio, Pennsylvania and New York. S. S. King is manager.

♦

Porter-Cable Machine Co., Syracuse, N. Y., maker of portable and stationary sanding and sawing machines, through purchase of adjoining land and buildings, has added 90,000 square feet to its present manufacturing facilities, for expansion purposes.

♦

Ransome Concrete Machinery Co., Dunellen, N. J., has appointed the following representatives for its welding equipment division: Cheever Equipment, Seattle, covering Alaska, Washington and part of Idaho; Vic-

tor Equipment Co., in California, with offices in San Francisco and Los Angeles; Austin-Hastings Co. Inc., Cambridge, Mass., in the New England states.

♦

Divco-Twin Truck Co., Detroit, manufacturer of house-to-house delivery vehicles, has under construction a new manufacturing plant to be ready for occupancy Aug. 1. It will triple the company's present capacity.

♦

Diehl Mfg. Co., electrical division of Singer Mfg. Co., Elizabethport, N. J., and manufacturer of electric motors, generators and ventilating equipment, has opened an office in the Johnston building, Charlotte, N. C., in charge of James H. Lewis.

♦

International Filter Co., Chicago, has moved its administrative and sales offices to its plant at 325 West Twenty-fifth place, to co-ordinate more effectively administrative, sales, engineering and production departments.

♦

C. M. Kemp Mfg. Co., Baltimore, has appointed Byron L. Ashdown, Syndicate Trust building, St. Louis, as representative in Missouri, Kansas and part of Illinois, and Bridges-Wilson Corp., 27 Haymarket square, Boston, to cover eastern Massachusetts, Rhode Island, Maine and New Hampshire.

♦

Galen Snow Inc., Springfield, Mass., advertising agency, has changed its name to Snow, Bates & Orme Inc. J. D. Bates Jr., formerly manager, J. D. Bates Co., has joined the agency as a vice president. Galen Snow continues as president and general manager, and Albert M. Orme as vice president.

♦

General Electric Vapor Lamp Co., Hoboken, N. J., has been merged with the incandescent lamp department of General Electric Co., Schenectady, N. Y. Because of this change, by which activities in incandescent and electric discharge lamps are brought together, the incandescent lamp department hereafter will be known as the lamp department.

♦

Charles Wagner Litho Machinery Co., Hoboken, N. J., division of National-Standard Co., has entered the industrial oven field. Continuing its lines of decorative metal ovens, it is adding a complete line of industrial ovens, including core and mold, drying, armature and coil, conveyor ovens and other types. Stock size ovens have been worked out to fit most applications by changing heating equipment and ventilating systems, using standard panels, facilitating erection, expansion or revision.

♦

Federated Metals division, American Smelting & Refining Co., New York, large producer of secondary nonferrous metals, has started operations in its new plant at Whiting, Ill. Structure has 10,000 square feet of floor space, two stories, with modern devices for safety and efficiency. Group is interconnected, each unit devoted to a single process. Glass block provides lighting and interior walls are acid-proof washable tile. Fumes are filtered in a bag house and metallic contents reclaimed. Capacity is 8000 to 10,000 tons per month with provision for 50 per cent increase. Plant was erected by the Austin Co., Cleveland.

Annual Scrap Collection Under Way in Germany

■ To augment Germany's supplies of metals, particularly iron, without further depleting foreign exchange, the government has designated July and August as a period for collecting old metals. Scrap metal under the government's interpretation includes any metal not having urgent utilitarian purpose.

Old metals collections were started in 1936 after the reich's armament and building program caused a severe metals shortage. Last year's collections are said to have yielded three times the amount gathered in 1937, and Nazis hope this year's campaign to yield more than last year's. For the first time, the collections will be extended into Austria and possibly the Sudetenland.

The special steel used on Diesel engine crankshafts was so hard on a certain hand tapping operation that 30 holes per tap was a record.

When a "Greenfield" engineer analyzed the job he recommended a six flute precision ground tap specially chamfered and hooked for hand tapping. Result—62 holes per tap between grinds.

From 30 to 62 holes per tap means over 105% increase. So here's the tip—Just because a job isn't "production" don't neglect to get expert advice. It can save you real money.

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In Canada: Greenfield Tap & Die Corp. of Canada, Ltd., Galt, Ontario.

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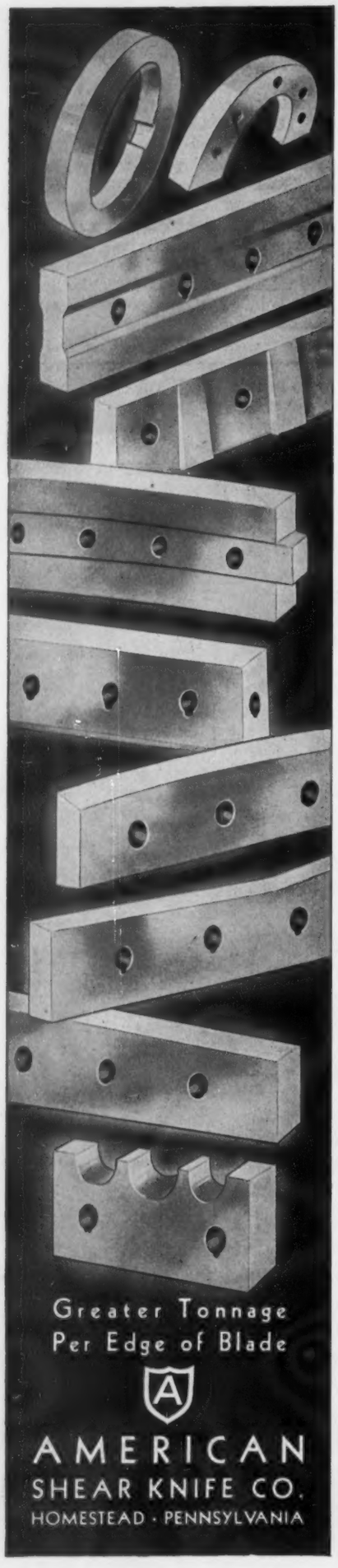


Spain May Buy New Machinery in Germany

■ The Spanish government is considering a $64,000,000 purchase of industrial machinery from Germany to attempt to rehabilitate its domestic iron and steel industry to 1929 levels, according to the machinery division, department of commerce.

Plans to bring the Spanish steel industry's production to 1,500,000 tons per year have already progressed to the point of sending a technical commission to Germany in anticipation of securing large quantities of machinery and other manufacturing equipment.

Industrial establishments in Barcelona and Sagunta appear to have suffered the greatest damage and deterioration in the reecnt hostilities.

The rehabilitation project calls for replacement of ten blast furnaces and the modernization of a number of steel mills.

Spain's steel production decreased from 1,700,000 tons in 1929 to 543,000 tons in 1932. Production of cast iron decreased from 750,000 tons to 296,000 tons in the same period.

Waste Material Workers Granted Wage Increase

■ New York chapter, Institute of Scrap Iron and Steel Inc., has negotiated a new contract with Waste Material Workers union, American Federation of Labor affiliate, providing for an increase of 5 cents per hour and a slightly shorter work-week. About 600 workers are affected.

New base rate for yard workers is 52½ cents an hour; chauffeurs, 72½ cents; full time burners, 72½ cents; barge trimmers, 75 cents. The work-week will be 42 hours, two less than previously. Workers on the payroll a year or more will receive four holidays per year with pay.

Manganese Steel Expands Chicago Heights Plant

■ American Manganese Steel division of American Brake Shoe & Foundry Co., New York, has expanded its main plant at Chicago Heights, Ill., with a new administration building, 94 x 105 feet, and six additions. Employes' welfare building is 55 x 82 feet, two stories. Underground passage from the foundry addition to the welfare building basement protects employes from chill when heated.

Foundry addition is 80 x 120 feet. Chemical laboratory and melting department offices adjoin this structure, 25 x 115 feet. New pattern storage is 127 x 152 feet; machine shop addition, 50 x 80 feet. A new heating plant with two 200-horsepower boilers, oil-fired, controlled by photoelectric cells, with forced-flow hot water system, heats the shops.

Equipment

Chicago—Machinery business last week was only moderate, but so far the month compares favorably with June. Improvement is expected to be noted this week. Several lists expected to close last week are still pending. Demand is from a wide range of industries. Needs of snow

OUR AIM is to render service. A little more complete . . . more hospitable . . . more pleasing . . . than even the most exacting guest expects.

CHAS. H. LOTT
Manager

Every Room Outside with Private Bath
Single from $2.50
Double from $4.00

DETROIT LELAND HOTEL

CASS AT BAGLEY AVE.
GARAGE IN CONNECTION

plow and snow fence makers are rather prominent in some quarters, as those manufacturers must be set up and ready to go by Sept. 1. Otherwise demand consists mostly of odds and ends. Inquiries are only fair at present, being slightly lighter last week. Agricultural interests are buying more tools, but not improving heavy machinery requirements.

Seattle — Seasonal recession accounts for less activity but road equipment and electrical items remain fairly active. Kittitas county, Washington, has purchasel a 10-ton gas-powered road roller. Novelty Ornamental Iron Works, Seattle, will furnish all the bronze work for Seattle's new federal court house. Bonneville authority has awarded to Westinghouse at $165,870 contract for a synchronous condenser and to various suppliers contracts totaling $293,789 for compressors, fire pumps, cable, disconnecting switches and other items.

CONSTRUCTION and ENTERPRISE

Ohio

CALDWELL, O.—Village, S. D. Danford, mayor, proposes to issue $10,000 bonds to finance construction of a water filtration plant.

CLEVELAND — Cleveland Pneumatic Tool Co., L. W. Greve, president, has plans for a one-story laboratory building costing $40,000. E. McGeorge, Cleveland, architect.

HOPEDALE, O.—Village, Martin Houten, clerk, will vote July 28 on proposal to issue bonds to finance a new waterworks and softening plant costing $63,772. Consulting engineers, Carl J. Simon & Associates, Van Wert, O.

LAKEMORE, O. — Village, Charles Michaels, mayor, plans to build a sewerage system and activated sludge-type disposal plant costing in all about $162,000. Has filed application for WPA grant. Consulting engineer, Paul W. Elwell, 5005 Euclid avenue, Cleveland.

LORAIN, O.—City, Paul Mikus, service director, is taking survey in proposed construction of a sewage disposal plant. Consulting engineers, Wilbur Watson & Associates, 4614 Prospect avenue, Cleveland.

MANSFIELD, O.—Tappan Stove Co. has plans underway for an enameling plant to cost $100,000. C. W. Coklin, Mansfield, consultant.

MANSFIELD, O.—City, E. A. Nist, service director, is studying proposal to spend $170,000 for additional sewage handling equipment and $130,000 on new sewage plant buildings. Project includes installation of gas-driven electric generators costing $27,000. Floyd G. Browne & Associates, Marion, O., consulting engineers.

Connecticut

CENTERVILLE, CONN.—United Illuminating Co., Bridgeport, Conn., has plans for a one-story power substation costing $40,000 with equipment. R. W. Foote, New Haven, Conn., consulting engineer.

Massachusetts

QUINCY, MASS.—Bethlehem Shipbuilding Corp., E. R. Sinclair, purchasing agent, proposes to construct and equip a warehouse costing more than $150,000.

New York

FT. NIAGARA, N. Y.—United States army construction quartermaster has plans for a sewage disposal plant costing in excess of $50,000.

New Jersey

HARRISON, N. J.—National Oil Products Co., Charles P. Gulick, chairman of board, has plans for a five-story plant costing more than $150,000 for producing industrial chemicals and processing oils.

Pennsylvania

EVERETT, PA.—Bedford Rural Electric Co-operative Inc., H. L. Cline, president, has $250,000 REA allotment and will build 210 miles of rural electric transmission lines.

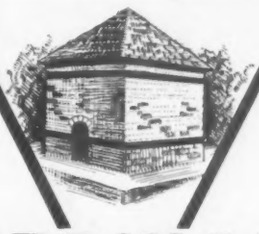
Michigan

ECORSE, MICH.—City plans to submit to voters at election a proposal to issue bonds to finance a pumping station addition and installation of a pump. Project to cost about $45,000. M. L. Brown & Sons, Detroit, consultants.

HOLLAND, MICH.—Chris-Craft Corp., Algonac, Mich., proposes to construct on

• For Heavy Duty Service
• Coil and Elliptic Springs
• Special Shapes and Spring Steel

FORT PITT SPRINGS



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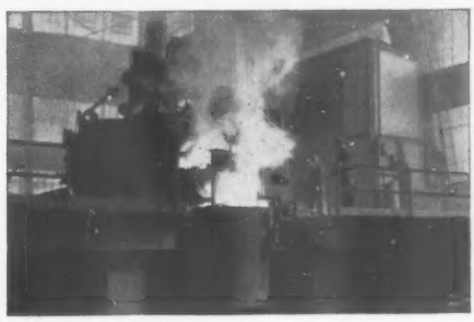

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IRVINE, WARREN COUNTY, PENNA., U. S. A.

a 30-acre site a boat plant estimated to cost more than $55,000.

MARINE CITY, MICH.—Detroit Gasket & Mfg. Co., Detroit, is taking bids on a one-story, 100 x 300-foot plant for producing a specialty product for building trade. Operations are scheduled to start about Oct. 1.

PLAINWELL, MICH.—Michigan Paper Co., A. Braginton, treasurer, plans to erect and equip a 75 x 225-foot coating mill to cost more than $63,000.

Illinois

AURORA, ILL.—Austin-Western Co., builder of road machinery, will soon let contract for a one-story plant costing $150,000. E. O. Sessions, Chicago, engineer.

CHICAGO—Commonwealth Edison Co. asks bids on a switchhouse and high transmission terminal building costing $100,000 at Fisk Street station. Shaw, Naess & Murphy, Chicago, consulting engineers.

ELIZABETH, ILL.—Jo-Carroll Electric co-operative has received a $244,000 REA allotment and will build rural electric transmission lines amounting to some 275 miles in two counties.

Indiana

COLUMBIA CITY, IND.—Board of public works, J. A. Brown, chairman, proposes to improve municipal power and light plant at cost of $120,000. Will install a new 2500-kilowatt turbo-generator.

EVANSVILLE, IND.—Indiana Stove & Realty Corp., 1412 West Illinois street, has been formed to manufacture stoves and castings. Has been authorized to issue 1000 shares no-par capital stock. George J. Zurstadt, Evansville, is one of three incorporators.

WARSAW, IND.—Arnolt Motor Co., has been organized with capital of 1000 shares $100-par stock to manufacture motors, machinery and other equipment. Stanley H. Arnolt, Warsaw, is an incorporator.

Alabama

MONTGOMERY, ALA.—Dixie Electric Membership Corp. has been allotted an additional $107,000 by REA for 137 miles of rural electric distribution lines in four counties.

District of Columbia

WASHINGTON—Navy department, bureau of supplies and accounts, takes bids until 10 a.m., July 21, on a motor-driven universal grinding machine with spare parts and tools (schedule 6706), and on a motor-driven universal milling machine (schedule 6711); and until July 25 on centrifugal pumps (schedule 6743).

Georgia

COLUMBUS, GA.—Muscogee Mfg. Co. will soon start construction of two new units to its plant at cost of $200,000 including machinery. Also planned is a water filtration plant costing $25,000.

North Carolina

DURHAM, N. C.—Borden Brick & Tile Co., Spurgeon Boyce, 704 Ramseur road, local manager, proposes to erect a $65,000 plant for manufacturing brick. Will comprise kilns, drying plant and machine shop.

South Carolina

BAMBERG, S. C.—Edisto Electric Co-operative Inc. has received a $149,000 allotment from REA for 188 miles of rural electric power lines in four counties.

Louisiana

SHREVEPORT, LA.—Coca-Cola Bottling Co., O. L. Biedenharn, general manager, will soon take bids on a bottling plant costing approximately $40,000. J. M. Shelton, Atlanta, Ga., consulting engineer.

Arkansas

LITTLE ROCK, ARK.—Arkansas Valley Electric Co-operative association has been granted an additional $141,000 REA allotment for extending its rural electric power transmission lines 162 miles in five counties.

Wisconsin

MADISON, WIS.—Fauerbach Brewing Co. will erect at cost of $175,000 a new bottling plant complete with modern machinery and equipment.

Texas

HOUSTON, TEX.—Champion Paper & Fibre Co., Hamilton, O., W. R. Crute, Houston manager, plans to erect at cost of $3,000,000 a new unit to its plant de-

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DRILL ROD
COLD DRAWN SHAPES

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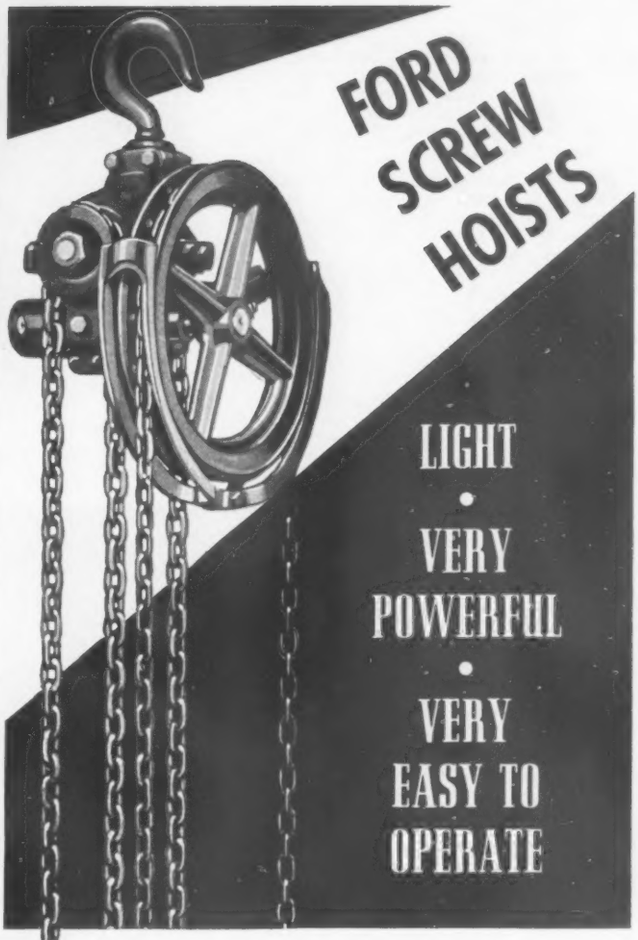

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voted to production of gloss finish and bond paper. Project is contingent upon approval of stockholders at Aug. 8 meeting. Will call for bids upon ratification. H. K. Ferguson, Cleveland, consulting engineer.

EMROY, TEX.—City, J. Hood, mayor, proposes to build a sanitary sewerage system and sewage disposal plant costing $30,000. J. J. Rady, Ft. Worth, Tex., consultant.

STAMFORD, TEX.—Stamford Electrical Co-operative Inc., Hugh B. Haterius, representative, plans rural lines costing $158,000.

WEATHERFORD, TEX.—City, Conrad Russell, mayor, has plans underway for building a light and power plant. Available are $250,000 bonds. Albert C. Moore & Co., San Antonio, Tex., consulting engineers.

Iowa

GUTHRIE CENTER, IOWA—REA has allotted $225,000 to Guthrie County Rural Electric co-operative, John A. McLuen, superintendent, to finance 264 miles rural transmission lines in three counties. Buell & Winter Engineering Co., Sioux City, Iowa, consultant.

MONTEZUMA, IOWA—Village, C. F. Dickson, clerk, takes bids to 10 a.m., Aug. 2, on a light plant building, and installation of three diesel electric generating units, switchboard and accessory gear, and distribution system. Certified check 5 per cent to accompany bid. A. S. Harrington, Baum building, Omaha, Nebr., consulting engineer. (Noted April 24.)

PRESTON, IOWA—Village, F. E. Tripp, clerk, receives bids until 2 p.m., Aug. 1, on four separate contracts for construction of municipal light and power plant and installation of equipment, including generators, exciters, cooling system, switchgear and panels. Certified check 5 per cent to accompany bid. Ralph W. Gearhart, Cedar Rapids, Iowa, consulting engineer. (Noted June 5.)

Wyoming

KEMMERER, WYO.—Lincoln Service Corp., R. M. Turner, president, will immediately begin installation of a new generator, switchboard, condenser and other equipment in its electric plant at cost of $125,000. (Noted July 3.)

Montana

LEWISTOWN, MONT.—Fergus County Rural Electric co-operative has been allotted $130,000 by REA for 120 miles rural transmission lines. J. W. Garrison, state water conservation board, Helena, Mont., engineer.

Pacific Coast

LOS ANGELES—Jackson Iron Works, 3057 East Slauson avenue, has awarded contract for constructing a fabricating plant to cost approximately $10,000.

LOS ANGELES—Certificate to conduct business under firm name of Engine Equipment Co., 2566 San Fernando road, has been issued to owner C. F. Chandler.

SAN FRANCISCO—Pacific Gas & Electric Co. receives bids on superstructures of two steam plants at Avon and Martinez, Calif., costing a total of more than $150,000.

SEATTLE—International Chemical Co., 723 Second avenue, has been incorporated with capital of $250,000 by C. R. Wilkes and associates.

WAPATO, WASH.—Wapato Indian Irrigation service, N. W. Irsfield, manager, takes bids to July 27 on hydroelectric turbine and generator for plant No. 2.

JUNEAU, ALASKA—Bureau of roads, district officer, will soon ask bids on a warehouse and 85 x 160-foot shop building, involving mechanical, paint and steel shops, boiler room, crane and other equipment.

Canada

VANCOUVER, B. C.—Kerr Mfg. Co. Ltd., 475 Howe street, has plans in progress for building a plant to manufacture automatic fire alarms and other equipment.

VANCOUVER, B. C.—Yale Saw Mills Ltd., 718 Granville street, proposes to construct saw and allied mills costing approximately $100,000.

HESPELER, ONT.—Ontario municipal board has ordered a plebiscite Dec. 1 on proposal to construct a sewage disposal plant costing about $117,000. James, Proctor & Redfern, Toronto, engineers.

ST. THOMAS, ONT.—St. Thomas Bronze Co. Ltd. takes bids this month on a plant addition costing $40,000. J. F. Findlay, St. Thomas, architect.

TORONTO, ONT.—Carbide Tool & Die Co. Ltd., R. W. Hart, 350 Bay street, representative, has plans for a $40,000 manufacturing plant. Maturity expected in fall.

MONTREAL, QUE.—Titanium & Steel Corp. Ltd., J. Fenston, 610 West St. James street, representative, proposes to build an iron and steel plant. To mature in fall.

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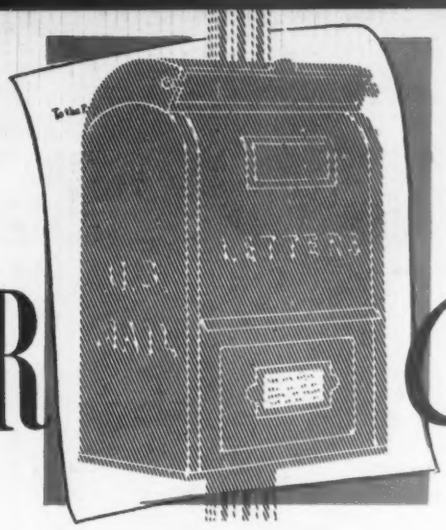

Readers are invited to comment upon articles, editorials, reports, prices or other editorial material appearing in STEEL. The editors cannot publish unsigned communications, but at their discretion may permit a writer to use a pseudonym when a bona fide reason exists for withholding his identity. Letters should be brief—preferably not exceeding 250 words.

Maintenance "a Headache"

To the Editor:

I have read the article by R. L. Hartford in the June 12 issue of STEEL.

I fully agree with his approach, but in my opinion he missed some of the specific ills from which the industry is now suffering. The omission can be readily excused as no one could adequately deal with a question of this magnitude in a short article.

Together with the high cost of obsolescence is the high cost of maintenance, by no means a small item in manufacturing cost of the shipped tonnage. And, while maintenance cost shows a healthy drop as tonnage increases, it is nevertheless one of those stationary expenses which require management "dynamite" to move it.

There are, of course, various methods of recording maintenance cost, depending on the accountants' judgment as to whether certain items are maintenance or capital investments, when considered from a tax standpoint. Nevertheless, maintenance, however interpreted, is high and is becoming the steel industry's chief "headache."

Thorough records of apparatus performance, cost of upkeep, frequency of replacement, etc., are important to the maintenance engineer in his analysis of maintenance cost and means to reduce it. While comparisons with other plants are important, a thorough understanding of his own problems backed up by ample records is the best means of attack.

The number of steel plant stockholder dividends, which are conspicuous by their absence, also points to another sickness of the steel industry. One could suggest an Institute of Steel Company Stockholders with its proper complement of committees which may give sufficient impetus to a movement for adequate steel prices and resumption of dividends.

MARTIN J. CONWAY

Fuel Engineer,
Lukens Steel Co.,
Coatesville, Pa.

Greater Refinement, Steel Aim

To the Editor:

I think your Mr. Hartford, in his article, (STEEL, June 26, p. 12) has pictured the technical progress in the steel industry in fine shape . . .

He is correct in stating that steelmaking has not changed fundamentally and at present it seems to be a problem of bringing greater refinement to the individual stages. In some specific problems—slag control for example—we are really a step or two ahead of ourselves. We can control slag composition quite readily but we know too little about the effects of slag composition upon steel quality and as a result much time is being spent upon this problem. I believe a number of stages of the steel industry are in a similar fix.

Refinements in furnace construction are constanty being completed and as a result steel tonnages, with their lowering of costs, are increasing steadily. A good example is a local furnace of about 135 tons capacity which by a radical change in design has been able to produce over 10,000 tons in one month.

Greater efficiency of all operations, uniformity of quality, refinement of individual operations, larger tonnages—all of these items being noted by Mr. Hartford—are the present aims of the steel industry and are the ones upon which most of the development work is being concentrated.

The problem of the direct production of steel is always of interest and at least one plant in the Pittsburgh district has been quite successful in the direct casting of steel billets.

W. J. REAGAN

Asst. Supt. open hearth,
Edgewater Steel Co.,
Pittsburgh.

Should Consider Social Side

To the Editor:

We have reviewed the article in STEEL, June 12, p. 23, captioned "Steel Spends Billion for Modernizing."

While the article is very interesting and instructive, it appears to us that Mr. Hartford neglected the most important issue of the day in regard to the subject matter. Any such article as this is not complete without taking into consideration the problems created by so-called "technological unemployment."

Such an article inflames labor and gives to such men as Ruttenberg and others, material for drastically criticizing industry and raising embarrassing social questions. Had this article been written with this matter in mind, it could have been turned to advantage by considering labor, the ultimate effect upon labor, the effect upon wages, standard of living, etc., confessing the immediate problem by predicting the ultimate advantage.

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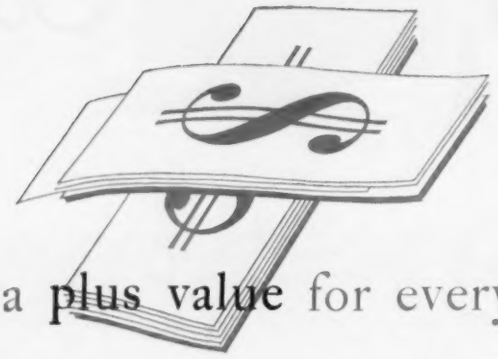

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